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FARM MANAGEMENT CROP MANUAL

*Revised
Edition*

Indian Dairy Science Association
HOSUR ROAD, BANGALORE

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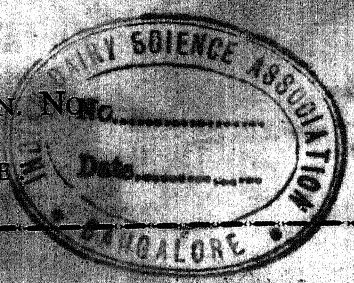
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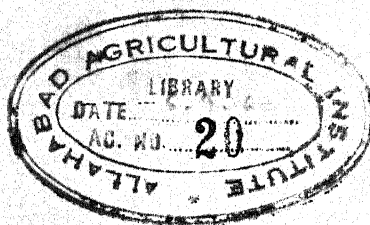
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Introduction

The present Farm Management Crop Manual is the latest in a series of editions issued over the years. The genesis of the Manual was R. L. Adams' Farm Management Notes issued in 1916; subsequent revision and a total of seven editions followed. Successive editions were issued: in 1933, by R. L. Adams and L. A. Crawford; in 1941, by R. L. Adams; in 1943, a Supplement to the 1941 Manual, by R. L. Adams; and in 1948, the edition immediately preceding the present, by R. L. Adams and A. D. Reed.

The pages of this crop manual contain data, collected over a period of many years by the senior author and others working under his direction, needed to organize or reorganize the cropping programs of various farms. The data are those used by the authors in their work in farm management. They do not presume to be wholly inclusive, universally applicable, nor representative of actual costs borne by all farmers. Yet the contents should prove useful to farm managers, appraisers evaluating farms for loan or taxation purposes, to investors, and to students studying farm management, provided the data are utilized in a proper and intelligent manner, by making allowances and adjustments to fit specific cases.

While these examples of costs may, and it is hoped do, approximate costs of growers, they cannot be taken at full value as evidence of data compiled in more detail from cost records or survey data gathered from many farms. Their purpose is to aid in probing into ways and means of reorganizing farms, or selecting enterprises for new farms, rather than as criteria for tariff-making, Agricultural Adjustment programs, or marketing programs.

Localization of Data.—Because operations, equipment, and use of labor are based on relatively large-scale operations, rather distinctive soil types, and specially timed to meet climatic conditions, data are not included which specifically apply to the Imperial Valley, Coachella Valley, Palo Verde Valley, the Sacramento-San Joaquin deltas, the plateau area of Siskiyou, Modoc, and Lassen counties, the reclaimed Tule Lake, and Humboldt County, except where indicated as such. Conditions in these areas justify specific treatment. If and when a need is apparent, specific studies of others of the excepted areas listed above can and may be made. Thus details of this manual have greatest application to the Sacramento-San Joaquin Valley, most of the coast counties, and southern California other than the valleys mentioned above.

Comments on the Data.—The first part of this manual is directed to a discussion of prices received by producers and basic determination of various costs. These determinations include examples of wages; charges for management; costs of work animals, tractors, and trucks; cost of contract operations; charge for use of implements, machinery, and minor equipment; irrigating; and weights of commodities per bushel.

These basic cost determinations are followed by detailed examples, preceded by brief explanations to show the method of applying these data, plus other needed data, in order to determine necessary income (or price) from

a given crop if it is to meet all reasonable financial obligations.

Federal and State Programs.—Present or future State or Federal acts and regulations influence the choice of crops or marketing programs. These regulations may limit planting, acreages, or marketing of crops, and the inquiring farm operator should consult with the county farm advisor or local official charged with administering these different programs to determine the feasibility and wisdom of planting or marketing crops to which these programs may apply.

Part I

PRICES PAID TO PRODUCERS OF CALIFORNIA FRUIT, FIELD, AND TRUCK CROPS

The price received by different producers varies with quantity and quality, varieties, grades, earliness and lateness of shipping season, accessibility and receptivity of markets, methods of packing, kinds of containers, factors employed as selling agencies, relative bargaining abilities of buyers and sellers, the conditions of supply and demand within the industry, and the general price level of all commodities.

Price returns fluctuate from year to year, month to month, and from farm to farm. Any array of prices can at best be suggestive rather than actual yet in organizing or reorganizing farms some price basis is needed. Table 1 has been prepared merely for its suggestive rather than actual prices. It is the figure that the author is currently using. But the figures need revising from time to time, a task that must become an individual responsibility to collect data that shall be more appropriate to fit the outcome of future changes.

An acceptable figure which shall properly reflect returns to farm operators from sales of their commodities is somewhat difficult of determination yet, notwithstanding inherent difficulties, selling prices constitute data of so much value and importance that Table 1 was prepared to show the average level of prices paid to most producers during the period 1935-1939 and during 1951. The prices are based on times of year when the bulk of products is moving from the producers' hands to the market. For specific farms or communities, local variations must be recognized and allowed for because of differences which cannot be indicated in a publication of this scope.

Various sources were utilized in compiling these data, including reports of the Federal-State Marketing Service; reports of the California Cooperative Crop Reporting Service; market news pages of the Pacific Rural Press and California Cultivator; publications of various cooperative associations; data collected in the field from producers, buyers, and commission men by the authors; and price files of the Giannini Foundation.

Table 1

PRICES PAID PRODUCERS:
CALIFORNIA FIELD, FRUIT, AND TRUCK CROPS

Product	Unit	Average Prices	
		1935-1939	1951
<u>Field crops:</u>			
Alfalfa hay (baled)....	ton	\$10.00	\$26.00
Alfalfa seed	lb.	0.18	0.45
Barley.....	cwt.	1.05	2.50
Beans			
Baby limas	cwt.	4.08	6.50
Blackeyes	cwt.	4.09	8.25
Limas.....	cwt.	5.67	11.70
Pinks	cwt.	4.14	8.90
Small whites.....	cwt.	4.05	8.00
Corn (Indian)	cwt.	1.47	2.80
Cotton	lb.	0.09 ^a	0.40
Cottonseed	ton	23.56 ^a	70.00
Flaxseed.....	bu. (56 lbs.)	1.85	4.74
Grain hay (baled)....	ton	9.00	28.00
Hops.....	lb.	0.22	0.70
Oats.....	cwt.	1.28	3.30
Rice	cwt.	1.40	4.60
Sorghum (grain)	cwt.	1.19	3.10
Sugar beets	ton	5.86 ^b	11.00
Wheat	cwt.	1.35 ^b	3.40
<u>Fruits:</u>			
Almonds			
Softshells.....	lb.	0.16	0.24
Hardshells.....	lb.	0.10 $\frac{1}{2}$	0.18
Apples			
Fresh.....	bu.	0.50	1.10
Dried.....	lb.	...	0.19
Apricots			
Fresh.....	ton	35.00	110.00
Dried (choice)....	lb.	0.10	0.38
Avocadoes	lb.	0.07	0.15
Cherries			
Shipping.....	lb.	0.06	0.18
Canning	ton	120.00	300.00
Dates	lb.	0.06	0.08
Figs			
Fresh.....	ton	57.50	150.00
Dried	lb.	0.033	0.12
Grapes			
Wine.....	ton	15.00	30.00
Raisin	ton	55.00 ^c	160.00 ^c
Table	ton	19.00	35.00
Grapefruit	field box	0.70 ^a	1.15

Table 1
CONTINUED

Product	Unit	Average Prices	
		1935-1939	1951
Lemons	field box	\$ 1.90 ^a	\$ 3.00
Olives			
Canning	ton	87.00	250.00
Oil	ton	38.00	50.00
Oranges			
Navels	field box	0.80	2.50
Valencias	field box	1.00 ^a	1.75
Peaches			
Shipping	ton	26.00	65.00
Canning	ton	22.50	75.00
Dried (choice)	lb.	0.06	0.17
Pears			
Bartlett	ton	25.00	100.00
Dried (choice)	lb.	0.06	0.18
Plums	ton	33.50	110.00
Prunes	lb.	0.03	0.18
Walnuts	lb.	0.10	0.22
<u>Truck crops:</u>			
Artichokes	box (40 lbs.)	2.00	4.00
Asparagus			
Canning	lb.	0.08	0.11
Shipping	lb.	0.10	0.12
Broccoli	crate (42 lbs.)	...	3.30
Cabbage	ton	15.00	55.00
Cantaloupes			
Central Valley	crate (45 melons)	1.00	3.00
Carrots			
Spring	crate (6 doz.)	1.15	3.50
Fall	crate (6 doz.)	1.25	4.00
Winter	crate (6 doz.)	...	2.75
Cauliflower			
Spring	crate (37 lbs. 12-15 heads)	0.60	1.15
Fall and winter ...	crate (37 lbs. 12-15 heads)	0.55	1.00
Celery			
Fall	1/2 crate (65 lbs.)	1.40	2.25
Winter	1/2 crate (65 lbs.)	...	2.75
Spring	1/2 crate (65 lbs.)	1.05	1.90
Cucumbers			
Pickling	ton	21.00	50.00
Marketing	bushel (48 lbs.)	...	2.40
Lettuce			
Spring	crate (4 doz.) ^d	1.70	3.50
Summer	crate (4 doz.) ^d	1.40	3.30
Fall	crate (4 doz.) ^d	1.55	3.25
Onions			
Intermediate	sack (50 lbs.)	...	1.50
Late	sack (50 lbs.)	...	1.00

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Table 1
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Product	Unit	Average Prices	
		1935-1939	1951
Peas			
Market			
Spring	30-lb. hamper	\$ 1.15	\$ 2.25
Fall	30-lb. hamper	1.75	2.80
Winter	30-lb. hamper	...	2.75
Canning	ton	38.00	75.00
Peppers			
Bell	lb.	0.03	0.10
Chili (dried)	lb.	0.07	0.22
Potatoes (Irish)	cwt.	0.95 ^a	2.75
Spinach			
Marketing	bushel (18 lbs.)	...	0.60
Canning	ton	12.00	25.00
Strawberries			
Southern	crate (24 qt.)	...	9.20
Northern	crate (24 qt.)	...	8.60
Sweet potatoes	cwt.	1.30	8.00
Tomatoes			
Shipping			
Early	lug (32 lbs.)	...	2.50
Summer	lug (32 lbs.)	...	2.00
Late			
Northern	lug (32 lbs.)	...	2.35
Southern	lug (32 lbs.)	...	2.20
Canning	ton	13.00	30.00
Watermelons			
Imperial Valley	ton	140.00	55.00 ^e
Other areas	ton	114.00	32.00 ^e

^aYears 1937-1939 only since prices reflect a marked decline since 1936.

^bNot including Agricultural Adjustment Administration payments.

^cDried basis.

^dFive dozen crates for 1946.

^eTon basis.

Part II

CALCULATIONS OF BASIC COSTS

Costs of producing farm products are made up of two classes of items, commonly designated as (1) direct or operating costs, and (2) indirect or overhead costs. Direct costs include cash outlays or out-of-pocket expenses for items such as hired labor; marketing containers; repair parts; purchased seed, feed, materials and supplies; taxes; etc. Indirect costs comprise sums which are (or should be) set aside annually to cover depreciation of equipment, improvements, and livestock; mortality of livestock; interest on farm capital; and charges for management.

These two classes of items together make up the total cost of producing farm products and may be computed on the basis of the farm, the enterprise, the producing unit (acre of land or head of productive livestock) or unit of commodity produced.

The following pages deal with the method of calculating costs on a per acre basis, and present standard costs for the more common operations.

Labor Costs.—The cost of farm help usually constitutes the largest single item of direct farm expenditures in connection with the production of crops. Feed and labor are the largest items in connection with the production of livestock and livestock products. This labor cost is made up of cash wages plus the value of board and lodging when the latter are furnished as a part of the laborer's compensation.

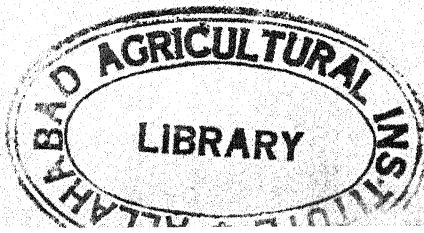
The cost of board (cook, helper, food, fuel, and use of cook-house and equipment) is variously estimated by California farm managers at \$1.25 to \$2.50 per day, with \$2.00 per day a close average. Board at \$2.00 adds about 22 cents per hour to the cost of labor.

The cost of housing is a combination of (a) interest on investment, (b) depreciation, (c) upkeep, (d) taxes, and (e) insurance. Our investigations show an average investment in housing facilities, amounting to \$95 per man. If occupancy amounts to 4 months per year, the cost is as follows:

Interest (at 5 per cent on average investment)	\$2.38
Depreciation (at 3 per cent of initial cost)	2.85
Upkeep (at 2 per cent of initial cost)	1.90
Taxes (at 2 per cent of average investment)	0.95
Insurance (at 1-1/2 per cent of average investment)	0.71
Annual charge	\$8.79

The housing charge per hour of work (900 hours) amounts to about 1 cent per hour. Board and lodging together total about 23 cents per hour.

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Wage rates as used in these costs reflect: (a) Wages paid per hour, day, or task for special tasks requiring employing workers on a temporary basis (such as picking crops, thinning sugar beets, thinning fruits, topping onions, etc.). (b) Wages paid to general farm hands, including work on pick-up balers, small combine threshers, occasional tractor driving, irrigating, pruning, spraying, etc.

Rates used in this text are: (a) Prevailing rates paid for special tasks. (b) Eighty five cents per hour for general farm hands employed in orchards and vineyards; eighty cents in truck crops; and one dollar on field crops. The rate is deemed to be about the same whether or not board and lodging are furnished by the employer since the actual cash payment is reduced by the value of any board or lodging so supplied.

Compensation Insurance.—Insurance on hired labor is charged as follows:

Type of farm	Charge per \$100 payroll
Field crop—includes hay and all cereal crops	\$4.20
Orchard—all tree crops and hops	2.30
Truck and vineyards—includes vegetables, cotton, potatoes, sugar beets, and berry crops	1.24

Day's Work.—The rate at which farm operations are performed influences various items of cost. The rate determines the accomplishment per hour or per day achieved by farm labor engaged in either hand work or in operating units of farm equipment. This rate is influenced both by the physical or environmental conditions under which the work is carried on and by the adaptability of the workers and equipment to the tasks which are performed. Owing to marked differences in the physical conditions between farms, capabilities of various classes and types of labor, and to the size, type, and condition of workstock and equipment, a wide variation in the accomplishment per hour or per day in the performance of various operations is bound to exist. Widespread investigation within the principal producing areas where labor is trained for and equipment is adapted to the types of operations to be performed, reveals a standard of performance for each operation and for each type and size of equipment, attained by farm labor operating under the guidance of farm managers and the better informed growers. The results of these investigations have been compiled under two headings:

1. Operations requiring man labor only.
2. Operations performed with horse or tractor-drawn farm implements.

Operations Requiring Man Labor Only.—Standard performance of operations requiring man labor and hand tools only are presented in Table 2. No attempt has been made to show the number of hours required per acre since this figure varies with the number of trees, vines, or bushes planted per acre, and with the yield. Each case must, therefore, be calculated individually. For instance, the number of man hours required for pruning depends on the rate of work, the amount of work, and the number of trees per acre. If the orchard consists of trees planted 18 feet by 18 feet (with no misses or skips) there will be 134 trees (43,560 square feet divided by 324). Similarly, if the planting is 20 feet by 20 feet there will be 108 trees. If the distance is 24 feet by 24 feet there will be 75 trees. At a pruning rate of 3 trees per hour the total will be as follows:

Trees planted	Number of trees	Man hours required per acre
18 feet x 18 feet	134	45 hours
20 feet x 20 feet	108	36 hours
24 feet x 24 feet	75	25 hours

Similarly, even with rate of picking apricots (or peaches) increasing with increases in yield per acre, the man labor requirements for picking yields of 6,000, 9,500, 15,000 and 21,000 pounds per acre are about as follows:

Apricots		
Yield per acre (pounds)	Rate of picking per man day of 9 hours (pounds)	Picking labor per acre (man days)
6,000	750	8
9,500	950	10
15,000	1,000	15
21,000	1,200	17.5

Peaches		
Yield per acre (tons)	Rate of picking (man hours per ton)	Picking labor per acre (man hours)
6	12.5	75
10	10.5	105
14	8.5	119
18	7.5	135

Table 2

USUAL OUTPUT PER MAN-DAY FOR SPECIFIED CROPS AND TASKS
(For conditions of good yields; and normal working conditions)

Crop	Task	Usual rate (9-hour day)
Almonds	Pruning	1.0 acre
	Brush disposal	4.5 acres
	Knocking: softshell varieties	300 lbs. (if yield 1,000 lbs. or more)
	hardshell varieties	500 lbs. (if yield 1,000 lbs. or more)
Apples	Pruning	0.25 acre
	Brush disposal	2.5 acres
	Thinning	0.25 acres
	Picking (for shipping)	1.0 ton
	Picking (for drying)	1.25 ton
	Sorting and wiping	1.0 ton
	Packing	75 boxes
	Nailing boxes	270 boxes
Apricots	Pruning	0.2 acre
	Brush disposal	2.5 acres
	Thinning	0.25 acre
	Cutting sprouts	180 trees

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Table 2

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Crop	Task	Usual rate (9-hour day)
Apricots (cont.)	Digging borers	90 trees
	Picking (for shipping)	1,200 lbs.
	Picking (for drying)	1,500 lbs.
	Cutting	750 lbs.
Asparagus.....	Cutting, hauling, trimming, sorting and packing:	
	White asparagus	360 lbs.
	Green asparagus	540 lbs.
Beans.....	Hoeing and planting misses	0.5 acre
	Hoeing and weeding	2.5 acres
Bush fruits		
Blackberries..	Pruning and thinning wood	0.18 acre
	Picking (trays of 6 baskets)	27 trays
	Picking	300 lbs.
Raspberries..	Picking	150 lbs.
Youngberries..	Picking	300 lbs.
Cabbage	Planting (hand)	0.33 acre
	Hoeing	0.75 acre
	Dusting	1.5 acres
	Cutting	90 crates
	Packing	45 crates
Cantaloupes (see melons)		
Carrots	Weeding	0.33 acre
	Hoeing	1.0 acre
	Pulling and bunching	13.5 crates of 6 dozen bunches
Cauliflower.....	Hand planting	0.5 acre
	Hoeing	1.25 acre
	Cutting	72 crates
	Packing	45 crates
Celery	Weeding	0.5 acre
	Harvesting	25 crates
Cherries	Pruning	0.75 acre
	Pruning, mature trees	27 trees
	Cutting sprouts	180 trees
	Picking	180 lbs.
	Packing (10-lb. boxes, faced on one side)	9 boxes
	Picking (shipping)	150 lbs.
	Picking (canning)	200 lbs.
	Sorting and loose packing	900 lbs.
Corn (grain)	Tight packing (10-lb. boxes)	225 lbs.
	Husking (from standing corn)	54 bushels
	Picking, husking, hauling, and cribbing, 2,000 lb. yield	0.75 acre
Corn (sweet)....	Hoeing	1.0 acre
	Picking and packing	70 lugs of 3 dozen ears
Cotton	Chopping	2.5 acres
	Hoeing	2.7 acres

Table 2
CONTINUED

Crop	Task	Usual rate (9-hour day)
Cotton (cont.) . . .	Weeding	4.5 acres
	Picking	300 lbs. (seed cotton)
Cucumbers	Hoeing and thinning	0.5 acre
	Hoeing (second time)	3.0 acres
	Picking	800 lbs.
Currants	Pruning	0.25 acre
	Hoeing	0.33 acre
	Picking	9 crates of 18 lbs. net
Dates	Picking	250 lbs.
Figs	Pruning (Kadotas)	0.3 acre
	Pruning (others)	0.5 acre
	Caprifying	1.0 acre
	Picking (Kadotas)	400 lbs.
	Picking (others—shipping)	300 lbs.
	Picking up (for drying)	700 lbs.
Grain	Shocking after binding	9 acres
Grapefruit	Picking	90 field boxes
Grapes (raisin)..	Pruning (trellis system)	0.5 acre
	Pruning (short system)	0.66 acre
	Tying and wrapping	1.5 acres
	Dusting	20 acres
	Hoeing around vines	900 vines
	Suckering vines	1,800 vines
	Picking	100-200 trays of 22 lbs.
	Turning trays	1,500 trays of 22 lbs. green weight, 5.5 lbs. dried
	Rolling paper trays	1,500 trays of 22 lbs. green weight, 5.5 lbs. dried
	Boxing and delivering	2.5 tons
Grapes (wine varieties)	Pruning	0.75 acre
	Brush disposal	10.0 acres
	Picking (dry wine varieties)	2,000 lbs.
	Picking (sweet wine varieties)	3,000 lbs.
Grapes (table varieties)	Pruning	0.4 acre
	Brush disposal	10.0 acres
	Suckering	1.5 acres
	Thinning and girdling	0.37 acre
	Girdling only	1.0 acre
	Dusting	20.0 acres
	Hoeing	2.0 acres
	Picking (table varieties)	1,500 lbs.
Hops	Pruning, stringing, and training	0.5 acre
	Picking	250 lbs. (green weight)
Lemons	Picking	20 field boxes (varies from 10-30 field boxes)
Lettuce	Thinning	0.5 acre
	Hoeing	1.0 acre

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Table 2
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Crop	Task	Usual rate (9-hour day)
Lettuce (cont.)	Cutting	22.5 field crates
	Dry packing in field	63 crates
Melons	Hoeing	1.0 acre
	Thinning	10 acres
	Turning vines	2.0 acres
	Sorting (cantaloupes)	12.6 tons
	Packing (cantaloupes)	225 crates (of 70 lbs.)
	Picking (cantaloupes)	30 crates
	Picking (Honey Balls)	30 crates
	Picking (Honeydews)	100 crates
Olives	Pruning	0.2 acre
	Picking (for oil)	400 lbs.
	Picking (for pickling)	300 lbs.
Onions	Transplanting to field	0.2 acre
	Weeding	1.0 acre
	Hand cultivating	1.5 acres
	Hoeing (first time)	0.5 acre
	Hoeing (second time)	1.5 acres
	Pulling and windrowing	1.0 acre
	Topping, sorting and sacking	2,000 lbs.
Oranges	Pruning	0.25 acre
	Picking	50 field boxes (33 packed boxes)
Peaches	Pruning	0.25 acre
	Brush disposal	2.5 acres
	Thinning	0.2 acre
	Cutting sprouts	180 trees
	Digging borers	90 trees
	Hoeing around trees	126 trees
	Picking (freestones for shipping)	1,500 lbs.
	Packing (freestones)	80-150 boxes
	Picking (for drying)	2,000 lbs.
	Cutting to dry (freestones)	2,500 lbs.
	Cutting to dry (clingstones)	1,000 lbs.
Pears	Pruning	0.25 acre
	Brush disposal	3.0 acres
	Hoeing and suckering	2.0 acres
	Cutting top blight	90 trees
	Cutting sprouts	126 trees
	Hoeing around trees	126 trees
	Banding (for insects)	63 trees
	Picking	1,600 lbs.
	Cutting for drying	1,000 lbs.
Peas	Hoeing	1.0 acre
	Picking (poled varieties)	180 lbs.
	Picking (bush varieties)	300 lbs.
Peppers	Thinning and resetting	2.0 acres
	Hoeing	1.5 acres
	Picking (for drying)	3,000 lbs. (green weight)
	Picking (for canning)	2,000 lbs. (green weight)

Table 2
CONTINUED

Crop	Task	Usual rate (9-hour day)
Persimmons....	Picking	1,800 lbs.
Plums.....	Pruning	0.25 acre
	Thinning	0.2 acre
	Picking	800 lbs.
Potatoes.....	Cutting seed	2,000 lbs.
	Hoeing	1.5 acres
	Picking up after digging and sacking	6,000 lbs.
Prunes.....	Pruning	0.5 acre
	Brush disposal	2.5 acres
	Picking up for drying	2,000 lbs.
Spinach.....	Hoeing and thinning	0.66 acre
	Cutting for canning	2.0 tons
Squash.....	Picking	50 crates of 24 lbs.
Stock beets.....	Thinning and weeding	11,250 feet of row
	Hoeing	0.9 acre
	Pulling and loading	9.0 tons
Strawberries....	Hoeing	0.05 acre
	Picking	15 crates
String beans....	Picking	360 lbs.
Sugar beets.....	Thinning	0.5 acre
	Hoeing (first time)	1.5 acres
	Hoeing (second time)	2.5 acres
	Pulling, topping and loading	5 tons
Sweet potatoes ..	Planting	0.6 acre
	Hoeing	1.5 acres
	Harvesting	0.15 acre
	Picking up	65 lugs
	Picking up and packing	30 lugs
	Picking up, rough sorting, piling, and covering	2,700 lbs.
	Sorting, grading, and packing in crates	7,200 lbs.
Tomatoes.....	Transplanting to field (hand)	0.75 acre
	Hoeing	1.0 acre
	Dusting	5.0 acres
	Picking (for market)	1,200 lbs.
	Picking (for canning)	2,500 lbs.
Walnuts.....	Thinning and hoeing	0.5 acre
	Knocking and picking up	200 lbs.
	Picking up and hand hulling	150 lbs.
Watermelons....	Hoeing, thinning, and replanting skips	1.0 acre
	Dusting with hand machine	9.0 acres
	Hoeing (second time)	3.0 acres
	Turning vines	4.0 acres
	Picking	2.0 tons
	Loading on trucks	4.0 tons
	Pitching to cars	3.0 tons

Source of data: Compiled from field collection of data. The data for important agricultural areas were published in mimeograph form for individual counties.

Day's Work with Horse- or Tractor-Drawn Farm Implements and Machines:
Method of Calculating.—The acreage which can be tilled, cultivated or harvested by horse- or tractor-drawn farm implements or machines may be calculated by use of the formula:

$$W \times H \times F = \text{acres covered per day}$$

W is the width of the implement in feet, measured at right angles to the direction of travel.

H is the number of hours that the implement is in use.

F is a factor of speed and represents the acreage covered in 1 hour by 1 foot of implement at the average speed maintained during the working period.

Factors for various speeds from 1 to 3 miles per hour, as used in this formula, are as follows:

Average speed miles per hour	Factor	Acres per foot 9-hour day	These factors are calculated as follows: At an average speed of 1 mile per hour a distance of 5,280 feet is traveled in 1 hour. Hence at this speed each foot- width of implement will cover 5,280 square feet which is 12/100 of 1 acre. This provides the factor 0.12 shown in the adjoining table for the speed of 1 mile per hour.
1	0.12	1.08	
1-1/4	0.15	1.35	
1-1/2	0.18	1.62	
1-3/4	0.21	1.89	
2	0.24	2.16	
2-1/2	0.30	2.70	
3	0.36	3.24	

Field investigations show that on soft ground or with a heavy load or in hot weather, horses walk at an average rate of 1-1/4 miles per hour. If the footing is firm, the horses not overloaded and the weather mild, the rate of walking is increased to 1-1/2 miles or more per hour.

Tractors are operated at speeds of 1-1/2 to 5 miles per hour but for most operations and with optimum loads, it was found that tractors will average 2-1/2 miles per hour when plowing, disking, or other heavy low-gear work, and 4 to 5 miles cultivating, mowing, and raking, etc.

The Load Factor.—In calculating the load per drawbar horsepower of tractors, one must take into account soil texture (whether heavy or light), moisture content, plant growth (whether foul with weeds or heavy with crop residues), topography, type and condition of tractor, driving ability of the operator, etc. The load per drawbar horsepower of tractors is based on standard makes for each of the sizes shown, in good working condition, and handled by a competent operator. Allowance has been made for usual variations in the physical conditions of soil, topography, etc., but exceptional conditions may require considerably more or less power per foot-width of implement. For example, particularly heavy soils, rough or hilly topography may require as much as one third more power than indicated in the tables.

Tables of Standard Performance for farm operations have been compiled showing the sizes and types of implements in common use, number of men, size of tractor required, load per drawbar horsepower of tractors, rate of work per hour and per 9-hour day, and the number of men or tractor hours required per acre.

The data for tractor-drawn farm implements and machines are set forth in Table 3.

Table 3

STANDARD PERFORMANCE FOR TRACTOR-DRAWN IMPLEMENTS AND MACHINES

(Showing number of men, load per draw bar horsepower, rate of work per day, and hours required per acre)

Operation	Implement or machine	Rate of work per 9-hour day acres	Average load per draw bar horse- power (width of implement-inches)	Crew	Hours required per acre	
					Man hours	Tractor hours
Baling hay	2 wire pickup baler	33 tons		3	0.91 ton	0.31 ton
	3 wire pickup baler	34 tons		4	1.21 ton	0.31 ton
	Twine tie pickup	30 tons		1	0.31 ton	0.31 ton
Binding grain	Stationary baler	18 tons		5	2.51 ton	0.51 ton
	8' binder	21.6	8.6	2	0.82	0.41
	10' binder	27.0		2	0.66	0.33
Combining grain	8' combine	18.3		2	0.98	0.49
	12' combine	25.9	9.3	3	1.05	0.35
	16' combine	36.6		3	1.00	0.25
Corn binder	1 row (42")	9.4	4.2	1	0.82	0.82
Disk and drill	10' single disk		6.0			
(tandem)	10' drill	27.0		1	0.33	0.33
	12' harrow					
Double disk harrowing	6' harrow	16.2		1	0.55	0.55
(no lapping)	10' harrow	27.0	8.0	1	0.33	0.33
Drilling grain	12' drill	27.0	14.4	1	0.33	0.33
Drill or harrow	10' drill	27.0	13.0	1	0.33	0.33
(tandem)	12' harrow					
Furrower	2-row (6')	16.2	7.2	1	0.55	0.55
	3-row (9')	24.3		1	0.37	0.37
Lister	3-row (9')	24.3	7.2	1	0.37	0.37
Mowing	7' mower	22.0	8.4	1	0.40	0.40
Plank drag or float						
(no lapping)	12' implement	32.4	14.0	1	0.28	0.28

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Table 3
CONTINUED

STANDARD PERFORMANCE FOR TRACTOR-DRAWN IMPLEMENTS AND MACHINES

(Showing number of men, load per draw bar horsepower, rate of work per day, and hours required per acre)

Operation	Implement or machine	Rate of work per 9-hour day acres	Average load per draw bar horse- power (width of implement-inches)	Crew	Hours required per acre	
					Man hours	Tractor hours
Plowing -5-6" deep.....	3-8" plow	5.4	2.4	1	1.63	1.63
Plowing -6-8" deep	2-12" plow	5.4	2.4	1	1.63	1.63
	3-12" plow	8.1		1	1.11	1.11
Plowing -9-10" deep	2-14" plow	6.3	2.4	1	1.43	1.43
	3-14" plow	9.5		1	0.95	0.95
Potato digger	1-row (42")	6.5	4.2	1	1.38	1.38
	2-row (6')	13.0		1	0.54	0.54
Potato planter	2-row (7')	15.1	8.4	1	0.60	0.60
Raking	12' dump rake	32.4	14.4	1	0.28	0.28
	10' side delivery	22.5		1	0.40	0.40
Single disk harrowing	10' harrow	27.0	12.0	1	0.33	0.33
(no lapping)	16' harrow	43.2		1	0.21	0.21
Spike-tooth harrowing	12' harrow	28.4	15.0	1	0.35	0.35
(lapping 3 ft.)	20' harrow	50.0		1	0.18	0.18
Spring-tooth harrowing	9' harrow	24.3	10.8	1	0.38	0.38
(no lapping)	13.5' harrow	36.5		1	0.25	0.25
Stalk cutter	2-row (6')	16.2	7.2	1	0.55	0.55
	3-row (9')	24.3		1	0.37	0.37
Weed cutting	8' weeder	21.6	9.6	1	0.41	0.41
(no lapping)	12' weeder	32.4		1	0.28	0.28

Management Charges.—The cost of management is an addition to the cost of manual labor. This charge can be calculated for prevailing salaries paid to farm managers plus the value of any perquisites (such as the use of the dwelling, use of automobiles, privilege of keeping livestock on the farm, and the value of fruits, vegetables, milk, eggs or other farm products supplied the farm manager). Methods of payment of salaries vary from a flat salary per month, with or without perquisites, to base salaries with profit sharing agreements or bonuses of varying amounts.

Table 4 presents annual per acre charges for management for the various types of California field, fruit, and truck crop farms computed on the basis of the usual acreage for each type of farm directed by farm managers whose time is fully occupied in organizing and administering the various details of the farm business and a cross section of the salaries (and value of perquisites) paid for such services.

Calculation of the charge for management for any specific case may be exemplified by the following:

If a manager, handling a farm of 320 acres, is paid a cash salary of \$3,600 per year and the value of the perquisites supplied amounts to \$1,200 annually, the charge per acre for management will be $[\$3,600 + \$1,200] \div 320 = \$15.00$.

Table 4
CHARGE PER ACRE AND PER DAY FOR MANAGEMENT OF
FIELD, FRUIT, AND TRUCK CROP FARMS IN CALIFORNIA

Type of farming	Minimum size of business justifying full-time manager	Total salary, use of house, car, fruit, eggs, vegetables, etc.	Charge per acre
Truck crops			
Lettuce, cauliflower, carrots, onions, cantaloupes, sweet potatoes, etc.	200 acres	\$4,800	\$24.00
Deciduous fruits			
Peaches, pears, plums, apples, figs, apricots, nuts, etc.	160 acres	4,800	30.00
Bush fruits and strawberries.....	100 acres	4,200	42.00
Subtropical fruits			
Oranges, lemons, grapefruit, avocados, olives, etc.	160 acres	4,200	26.25
Vineyards			
Raisin, table, and juice varieties	320 acres	4,200	13.00
Dry farmed field crops			
Barley, wheat, oats	800 acres	4,200	5.25
Irrigated field crops			
Alfalfa, beans, corn, cotton, rice, sugar beets, etc.	320 acres	4,800	15.00

Cost of Work Animals.—Work animal costs vary widely on different farms and in different localities due to variations in feeding practices and costs; value, age, weight, and condition of animals; amount of care required; and the number of work days that the animals are used. The unit factors and costs used in calculating a charge for work animals are shown in Table 5.

Table 5

COST PER DAY FOR USE OF WORK ANIMALS

Item	Cost
Feed amounts and costs, per head per year:	
Hay, 4 tons	\$64.00
Grain, 3/4 ton	30.00
Pasture, 4 months	20.00
Total feed costs	\$114.00
Care: Average of 15 minutes per head per day for 8 months at 75 cents per hour	45.00
Use of shelter and corrals (investment of \$90 per head; annual charge made up of taxes at 1 per cent, insurance at 1/2 per cent—these being figured on an average investment— depreciation and upkeep at 4 per cent on first cost)	6.30
Use of equipment (harness, curry combs, barn brooms, etc.) Investment per horse, \$25, charge consisting of:	
Upkeep (at 3 per cent)	
Depreciation (at 20 per cent)	
Taxes (ignored)	
Total costs for use of equipment	4.75
Miscellaneous charges (shoeing, veterinary, medicine, etc.) Per head per year	10.00
Mortality due to accidents and sickness (figured at 2 per cent of maximum value)	3.50
Taxes on horses	1.00
Interest (at 5 per cent on average value)	4.25
Maximum value, each \$175	
Total annual cost	\$188.80
Credit: 2 tons manure at \$5.00	10.00
	\$178.80
Estimated work life, 16 yrs. (2,000 work days)	
Work days used per year, 140	
Cost per work day, \$1.18	

Cost of operating tractors.—The following items are included in the annual cost of tractor operations:

- Fuel at 28 cents per gallon for gasoline and 12 cents per gallon for diesel fuel.
- Cylinder oil at 70 cents per gallon.
- Repairs at 3.0 per cent of original cost.
- Servicing at 1 per cent of original cost.
- Interest at 5 per cent of average value.
- Taxes at 0.5 per cent of original cost.
- Depreciation at 12.5 per cent of original cost.
- Shelter at 2 cents per square foot.
- Insurance at 0.5 per cent of original cost.

Table 6

COST OF OPERATING TRACTORS BASED ON USE OF EIGHTY 9-HOUR WORK DAYS ANNUALLY

Cost	1 Plow 9-12 HP Wheeled Rubber tired Gasoline	2 Plow 20 HP Wheeled Rubber tired Gasoline	3 Plow 35 HP Wheeled Iron wheel Gasoline	3 Plow 33 HP Track Gasoline	4 Plow 47 HP Track Gasoline	3 Plow 32 HP Track Diesel	4-5 Plow 42 HP Track Diesel	6-7 Plow 63 HP Track Diesel
Yearly expense								
Fuel.....	\$ 241.92	\$ 322.56	\$ 483.84	\$ 604.80	\$ 1,209.60	\$ 259.20	\$ 302.40	\$ 388.80
Cylinder oil	28.00	28.00	39.20	39.20	44.80	39.20	78.40	100.80
Other oil and grease.	3.60	4.50	5.40	7.00	10.00	7.50	10.00	17.50
Repairs.....	36.00	57.00	81.00	120.00	165.00	135.00	165.00	246.00
Servicing	12.00	19.00	27.00	40.00	55.00	45.00	55.00	82.00
Interest.....	30.00	47.50	67.50	100.00	137.50	112.50	137.50	205.00
Taxes	6.00	9.50	13.50	20.00	27.50	22.50	27.50	41.00
Depreciation	150.00	237.50	337.50	500.00	687.50	562.50	687.50	1,025.00
Shelter	1.50	1.50	1.75	1.75	2.50	2.00	2.50	3.00
Insurance	6.00	9.50	13.50	20.00	27.50	22.50	27.50	41.00
Total annual cost.	\$ 515.02	\$ 736.56	\$ 1,070.19	\$ 1,452.75	\$ 2,366.90	\$ 1,207.90	\$ 1,493.30	\$ 2,150.10
First cost	\$1,200.00	\$1,900.00	\$2,700.00	\$4,000.00	\$5,500.00	\$4,500.00	\$5,500.00	\$8,200.00
Fuel per day	10.80	14.40	21.60	27.00	54.00	27.00	31.50	40.50
Oil per day	0.50	0.50	0.70	0.70	0.80	0.70	1.40	1.80
Cost per day	6.44	9.21	13.38	18.16	29.59	15.10	18.67	26.88
Cost per hour (9-hr. day)	0.72	1.02	1.49	2.02	3.29	1.68	2.07	2.99

Table 7
COST OF OPERATING TRUCKS

	1/2 ton pick-up truck	1-1/2 ton truck
Yearly expenses (for 5,000 miles/yr.)		
Gasoline	\$ 93.33	\$116.67
Cylinder oil	14.70	17.50
Other oil and grease	1.25	1.75
Repairs	60.00	90.00
Servicing	30.00	50.00
Interest 5 per cent	42.50	60.00
Taxes and license	20.00	44.00
Depreciation	142.00	160.00
Insurance	50.00	60.00
Shelter 2¢ a square foot	2.80	3.60
Total annual cost	\$456.58	\$603.52
Cost per mile	0.09	0.12
Life-miles	60,000	75,000
First cost	\$1,700.00	\$2,400.00

Charge for Use of Farm Implements and Machines.—The annual charge for use of farm implements and machines is based on efficient use of each implement. The charge as figured for this text is a combination of:

- (a) Depreciation—(Figured at first cost divided by estimated total yrs. of use.)
- (b) Repairs—Average amount expended annually during life.
- (c) Taxes—Computed at 1 per cent of average capital value (equal to one half of original cost.)
- (d) Interest—Computed at 5 per cent on average annual investment.
- (e) Shelter—A charge of 2 cents per square foot calculated as follows: The cost per square foot for implement sheds was found to average 30 cents.

The annual charge per square foot is, therefore:

Depreciation at 4 per cent of first cost of 30¢.....	\$0.012
Upkeep at 1 per cent of first cost of 30¢.....	0.003
Taxes at 2 per cent of average investment.....	0.003
Insurance at 1-1/2 per cent of average investment ...	0.002

Total annual charge per square foot... \$0.020

Under some conditions (but omitted in these calculations) a charge for insurance could be added.

In accordance with the procedure outlined above, representative cost of the annual and daily charge for use of farm equipment have been compiled from data collected in the field and the results set forth below. The data of days of use annually and total useful life represent amounts expected with customary farming practice and reasonable (not maximum) efficiency in use. These figures, however, vary markedly from farm to farm because of differences in sizes and combinations of enterprises and types of power units used. In some few cases, the equipment may be expected to last longer than the years indicated. In these cases, the indicated life is a reasonable period of writing off the original investment. The data of repairs and taxes represent expected average annual amounts for the life of the equipment.

Table 8

COST OF USING EQUIPMENT

Implement	First cost	Life yrs.	Days used per yr.	Annual cost				Cost per day	Cost per hr. (9-hr. day)
				Repairs	Depreciation, taxes, interest	Shelter	Fuel & oil		
Almond huller	\$2,000.00	20	30	\$100.00	\$151.00	\$10.00	\$12.00	\$273.00	\$ 9.10
Almond boat	150.00	20	30	2.00	12.30	2.00	...	16.30	0.54
Almond mallets and canvas	100.00	4	30	...	27.00	...	...	27.00	0.90
Baled hay loader	350.00	15	45	7.00	32.93	3.00	...	42.93	0.10
Bean cutter									
2 row	60.00	15	15	2.00	5.80	0.24	...	8.04	0.06
4 row	143.00	15	15	3.00	13.82	1.00	...	17.82	0.13
Binders									
Corn-1 row horse	310.00	15	10	5.00	29.97	1.40	...	36.37	0.40
1 row tractor	445.00	15	10	7.50	43.02	1.40	...	51.92	0.58
2 row tractor	665.00	15	10	8.50	64.28	1.80	...	74.58	0.83
C-ain-6'	300.00	15	10	12.00	29.00	2.00	...	43.00	0.48
Grain-8'	400.00	15	10	16.00	38.67	2.80	...	57.47	0.64
Rice-8'	473.00	12	20	18.00	53.60	2.80	...	74.40	0.41
Broadcaster tractor	35.00	20	10	1.50	2.76	...	...	4.26	0.05
Brush burner	120.00	20	10	...	9.60	1.00	...	10.60	0.12
Buck rake									
Bunching-drag	50.00	20	10	4.00	4.00	0.20	...	8.20	0.09
Bucking-drag	65.00	20	10	4.50	5.20	0.30	...	10.00	0.11
Bucking-wheeled	100.00	20	10	5.00	8.00	1.60	...	14.60	0.16
Power	365.00	10	10	15.00	46.54	2.00	16.00	79.54	0.88
Chisels									
Asparagus 6'	200.00	15	20	3.00	19.33	0.50	...	22.83	0.13
Land 6'	106.00	15	20	2.50	10.25	0.50	...	13.25	0.07
Combines									
9'	1,400.00	15	30	40.00	135.33	4.00	45.00	224.33	7.48
12'	1,950.00	15	30	50.00	188.50	4.80	67.50	310.80	1.15
12' self propelled	3,600.00	15	30	108.00	339.00	5.00	94.78	546.78	2.03

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Table 8
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Implement	First cost	Life yrs.	Days used per yr.	Annual cost				Cost per day	Cost per hr. (9-hr. day)
				Repairs	Depreciation taxes, interest	Shelter	Fuel & oil		
Cultivator									
Horse-1 row	\$ 12.00	20	20	\$ 1.50	\$ 0.96	\$ 0.20	\$...	\$ 2.66	\$ 0.13
Horse-2 row	90.00	15	20	3.00	8.70	0.50	...	12.20	0.61
Tractor-2 row	152.00	15	20	5.00	14.54	0.60	...	20.14	0.91
Tractor-4 row	260.00	15	20	6.80	25.13	0.80	...	32.76	1.64
Disk harrow									
Horse-4' single	74.00	15	15	2.50	7.15	0.36	...	10.01	0.67
Horse-6' single	85.00	15	15	3.50	8.22	0.40	...	12.12	0.81
Horse-5' double	170.00	15	15	6.50	16.43	0.40	...	23.33	1.56
Horse-6' double	190.00	15	15	6.50	18.37	0.44	...	26.31	1.76
Tractor-6' single	140.00	20	20	5.60	11.20	0.45	...	11.65	0.66
Tractor-8' single	170.00	20	20	6.20	13.80	0.53	...	14.33	0.72
Tractor-20' single	400.00	20	20	12.00	41.00	1.10	...	54.10	2.70
Tractor-6' double	240.00	20	20	9.60	19.20	0.50	...	19.70	0.99
Tractor-7' double	280.00	20	20	11.20	22.40	0.55	...	22.95	1.15
Tractor-8' double	320.00	20	20	12.80	25.60	0.60	...	26.20	1.31
Tractor-10' double	400.00	20	20	16.00	32.00	0.70	...	48.70	2.44
Drag-12' plank	12.00	25	15	...	0.84	...	...	0.84	0.04
Duster									
2 row	185.00	15	20	4.00	17.88	0.80	...	22.68	1.14
3 row	245.00	15	20	5.00	23.68	1.00	...	29.68	1.38
4 row	300.00	15	20	6.00	29.00	1.20	...	36.20	1.81
Fertilizer drill	76.00	20	10	1.50	6.08	0.60	...	8.18	0.82
Fertilizer attachment 2 row	45.00	15	10	1.50	5.00	0.60	...	7.10	0.71
Float 8' x 24'	25.00	30	10	...	1.59	...	...	1.59	0.16
Furrower									
Deep-single 14"	110.00	20	10	2.00	8.80	0.40	...	11.20	1.12
Deep-double 14"	150.00	20	10	3.50	12.00	0.60	...	16.10	1.61

Deep-triple 14"	200.00	20	10	4.50	16.00	0.80	...	21.30	2.13	0.24
Shallow-4 shovel	120.00	15	20	2.00	11.60	0.70	...	14.30	0.72	0.08
Shallow-6 shovel	150.00	15	20	3.00	14.50	0.90	...	18.40	0.92	0.10
Grain drill										
10' single disk	285.00	20	10	4.50	22.80	1.00	...	28.30	2.83	0.31
10' double disk	325.00	20	10	4.50	26.00	1.20	...	32.70	3.27	0.36
Harrow, spike										
Horse 6'	20.00	20	15	0.25	1.60	0.06	...	1.91	0.13	0.01
Tractor 10'	45.00	20	20	0.50	3.61	0.08	...	3.69	0.18	0.02
Hay baler										
17" x 22" stationary	1,200.00	15	60	40.00	116.00	6.00	...	162.00	2.70	0.30
Pickup - 2 wire	1,265.00	10	40	63.30	161.30	6.00	64.40	295.00	7.38	0.82
Pickup - 3 wire	2,015.00	10	40	100.00	256.90	6.00	64.40	427.30	10.68	1.19
Pickup - twine tie	2,070.00	10	40	103.50	263.90	6.00	64.40	437.80	10.94	1.22
Hay loader.	190.00	15	30	6.00	18.37	1.00	...	25.37	0.85	0.09
Land plane; 8-60	1,400.00	20	20	28.00	108.50	...	...	136.50	6.82	0.76
Lettuce planting sled	90.00	10	20	2.00	11.70	0.36	...	14.06	0.71	0.08
Lister: 2 row	230.00	15	10	5.00	21.00	0.47	...	26.47	2.65	0.29
3 row	300.00	15	10	6.00	28.25	0.70	...	34.95	3.50	0.39
Manure spreader.	225.00	20	20	2.00	10.00	1.20	...	21.20	1.06	0.12
Mower										
Horse 6'	125.00	15	20	4.00	12.07	0.56	...	16.64	0.83	0.09
Tractor 7'	155.00	10	30	5.00	20.15	0.60	...	25.75	0.86	0.10
Mustard reaper	158.00	15	20	3.00	15.27	1.50	...	19.77	0.99	0.11
Onion cutter	25.00	10	20	0.50	3.25	0.60	...	4.35	0.22	0.02
Planters										
6 row beet	200.00	15	10	6.00	18.83	1.50	...	26.33	2.63	0.29
2 row (bean, corn, cotton) .	80.00	15	10	3.00	7.73	0.40	...	10.13	1.01	0.11
4 row (bean, beet)	135.00	15	10	4.00	13.06	1.20	...	17.26	1.73	0.19
2 row transplanter	140.00	15	10	3.00	15.53	...	...	16.53	1.65	0.18
3 row transplanter	1,000.00	15	20	30.00	94.16	1.20	...	125.36	6.27	0.70
Plows										
Moldboard										
Horse 12" single	22.00	15	15	1.50	2.13	0.16	...	3.79	0.25	0.03
Horse 14" single	26.00	15	15	2.00	2.51	0.18	...	4.69	0.31	0.03

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Table 8
CONTINUED

Implement	First cost	Life yrs.	Days used per yr.	Annual cost				Cost per day	Cost per hr. (9-hr. day)
				Repairs	Depreciation taxes, interest	Shelter	Fuel & oil		
Plows (cont.)									
Moldboard (cont.)									
Tractor 2-14"	\$ 210.00	15	15	\$ 5.00	\$ 20.30	\$ 0.45	\$...	\$ 20.75	\$ 1.38
Tractor 3-14"	235.00	15	15	9.40	22.73	0.47	...	23.20	1.55
Tractor 4-14"	255.00	15	15	10.20	25.16	0.50	...	35.86	2.39
Disk									
Horse 2-24"	233.00	15	15	1.50	22.54	0.30	...	24.34	1.62
Tractor 3-24"	350.00	15	15	14.00	33.83	0.40	...	34.23	2.28
Tractor 4-24"	380.00	15	15	15.20	36.73	0.46	...	36.19	2.48
Sweet potato	25.00	10	20	0.50	3.24	0.24	...	3.98	0.20
Potato digger									
Horse 1 row	228.00	15	30	4.00	22.04	1.00	...	27.04	0.91
Tractor 1 row	310.00	10	30	5.00	40.30	1.20	...	46.50	1.55
Pruning equipment	15.00	5	35	...	3.30	...	...	3.30	0.09
Rakes, hay									
10' dump	65.00	20	15	2.00	5.20	1.20	...	8.40	0.56
12' dump	75.00	20	15	2.00	6.00	1.40	...	9.40	0.63
Side delivery 10'	154.00	15	15	3.00	14.89	2.80	...	20.69	1.38
Ridgers									
Disk	65.00	20	10	1.50	5.20	0.30	...	7.00	0.08
V	135.00	20	10	2.50	10.80	0.40	...	13.70	0.15
Asparagus	200.00	8	40	2.00	31.00	1.20	...	34.20	0.10
Roller									
5' iron	56.00	20	10	0.50	4.48	0.40	...	5.38	0.54
8' iron	77.00	20	10	0.75	6.16	0.69	...	7.55	0.76
12' wooden	20.00	25	10	...	1.40	...	...	1.40	0.14
Ring scrapers									
5' Fresno	38.00	20	15	0.50	3.04	0.40	...	3.94	0.26
2-1/2' bucket	16.00	20	15	0.25	1.28	0.16	...	1.69	0.11

Sprayers										
300 gallon	1,050.00	15	30	15.00	101.50	1.20	26.70	144.40	4.80	0.53
400 gallon	1,200.00	15	30	16.00	116.00	1.20	31.50	164.70	5.49	0.61
Springtooth harrow										
10'	50.00	15	15	1.00	4.71	0.60	...	6.31	0.42	0.05
Stackers										
Derrick or fork										
Overshot 20'	135.00	15	30	7.50	13.05	...	...	20.55	0.69	0.08
Overshot 24'	154.00	15	30	10.00	14.99	...	...	24.99	0.83	0.09
Overshot 24'	172.00	15	30	12.00	16.63	...	...	28.63	0.95	0.11
Stalk cutter										
1 row	64.00	15	20	2.00	6.19	0.80	...	8.99	0.45	0.05
2 row	143.00	15	20	4.00	13.82	1.40	...	19.22	0.96	0.11
Sugar beet lifters										
1 row	100.00	12	40	3.00	11.33	1.20	...	15.53	0.39	0.04
2 row	140.00	12	40	4.50	15.87	1.60	...	21.97	0.55	0.06
Thresher 40"	2,500.00	15	30	75.00	241.67	10.00	...	326.67	10.89	1.21
Trailer										
Track										
4 wheel	350.00	20	30	10.50	27.13	2.00	...	37.63	1.25	0.14
2 wheel	200.00	20	30	4.00	15.50	2.00	...	21.50	0.72	0.08
2 wheel	150.00	20	50	10.00	12.70	1.60	...	24.30	0.49	0.05
Wagons										
1-1/2 ton	133.00	20	50	2.00	10.64	1.20	...	13.84	0.28	0.03
2-1/2 ton	159.00	20	50	2.50	12.72	1.60	...	16.82	0.34	0.04
Weed cutter										
Sulky	60.00	18	20	1.50	5.13	0.40	...	7.03	0.35	0.04
Cyclone	32.00	18	20	1.80	2.74	0.30	...	4.83	0.24	0.03
Weed sprayer	150.00	20	15	3.00	11.62	2.00	...	16.62	1.11	0.12

Table 9

ANNUAL CHARGE FOR USE OF MINOR EQUIPMENT

Item	Annual charge	Made up from*		
		First cost	Annual depreciation	Annual upkeep (averaged)
	each	each	each	each
Axes	\$0.28	\$ 2.75	\$0.28	\$...
Broadcaster (hand)	1.32	6.50	1.12	0.20
Brooms (barn)	1.50	1.50	1.50	...
Crowbars (30 lb.)	0.21	4.20	0.21	...
Cultivators (hand)	1.20	9.00	0.90	0.30
Dusters (hand)	2.35	15.00	1.85	0.50
Forks (hay)	0.90	2.30	0.80	0.10
Forks (manure)	0.55	2.60	0.55	...
Gopher traps	0.12	0.25	0.12	...
Grindstones	1.20	12.00	1.20	...
Hay hooks	0.25	0.75	0.25	...
Hoes	0.20	1.00	0.20	...
Hose (100')	4.00	12.00	4.00	...
Jab planters	0.40	1.75	0.40	...
Lanterns	0.55	1.50	0.30	0.25
Oil cans (1 pint)	0.15	0.50	0.15	...
Picks	0.17	1.15	0.12	0.05
Posthole diggers	0.28	2.75	0.28	...
Rakes	0.20	1.75	0.20	...
Rubber boots	3.00	6.00	3.00	...
Scythe and snath	0.75	3.00	0.50	0.25
Seeders (hand)	1.60	12.00	1.20	0.40
Shovels	0.60	2.50	0.50	0.10
Transplanters (hand)	0.75	6.50	0.65	0.20
Barn equipment				
Curry comb, brush, manure fork, hoof clippers, hoof rasp, harness repair kit, etc.	3.20	10.70	3.20	...
Eveners and neck yokes ...	4.50	20.00	4.00	0.50
Carpentering tools	4.20	43.00	3.20	1.00
Plumbing tools	3.25	25.00	2.50	0.75
Mechanics tools	1.50	15.00	1.50	...
Orchard equipment				
Almond sheets (pair) ...	7.00	20.00	7.00	...
Almond sled	3.00	25.00	2.50	0.50
Ladders 12'	0.90	7.20	0.90	...
Lug boxes 40 lb.	0.04	0.24	0.03	0.01
Props 1 x 4 x 12	0.02	0.12	0.02	...
Pruning shears (hand) ..	0.65	3.25	0.65	...
Pruning shears (long) ..	0.80	4.00	0.80	...

*Taxes and insurance ignored.

Table 9
CONTINUED

Item	Annual charge	Made up from*		
		First cost	Annual depreciation	Annual upkeep (averaged)
Orchard equipment (cont.)				
Raisin boxes	\$0.15	\$ 1.20	\$0.12	\$0.03
Trays 2 x 3	0.05	0.18	0.03	0.02
3 x 8	0.15	1.05	0.10	0.05
Wagon jacks.....	0.38	3.75	0.38	...
Wagon wrenches.....	0.18	1.75	0.18	...
Wheelbarrows.....	1.30	6.50	1.30	...
Wire stretchers	1.20	12.00	1.20	...

*Taxes and insurance ignored.

Costs of Contract Operations.—Certain farm operations are frequently performed and paid for on a contract basis. The rates charged for such operations vary somewhat in the various areas and within narrow limits between farms in the same area. The operations occasionally or regularly performed under contract and the prevailing rates charged for their performance in the principal producing areas are set forth in Table 10.

Table 10
COST OF CONTRACT OPERATIONS

Operation	Unit	Cost per unit	
		Range	Usual
Baling hay.....	ton	\$5.00-\$7.00	\$6.00
From windrow	ton	2.00- 3.00	
Cleaning beans	ton	...	3.00
Harvesting grain with combine	acre	6.00- 8.00	7.00
Harvesting peas with combine	acre	3.00- 4.00	4.00
Harvesting rice with combine equipped with pick-up attachment.....	cwt.	0.30- 0.40	
Threshing beans, with pick-up thresher	cwt.	0.40- 0.60	0.50
Threshing grain, with stationary thresher...	acre	4.00- 6.00	

Cost of Irrigation Water.—So many conditions are involved in connection with providing and applying irrigation water to crops in California that a separate determination of the prevailing cost is usually necessary for any given farm. Water may be purchased from an irrigation district, a mutual water company, a private company, or from a neighboring farmer. It may be pumped on the farm. If pumped, various lifts, sizes of equipment, nature of equipment (deep well or centrifugal pumps; motors, tractors or gasoline engines as a source of power), lengths of the irrigating season, and crop requirements and similar influences combine to cause a wide range in the cost of providing irrigation water. Various methods of applying water—by use of furrows, or contour, or strip checks—and the size of the irrigating head also exert an influence upon costs.

In connection with the data of crop costs used in this text an approximate figure is given to show the cost of obtaining and applying irrigation water. These figures are at best, however, merely illustrative. In a given case, specific data are needed.

If water be purchased by the acre-foot, acre-inch, miner's inch, or some other measure, then the problem of determining costs is relatively simple. If, however, a calculation of the cost of obtaining water from a farm pumping plant is necessary, then a rather lengthy list of items must be assembled in order to indicate the actual cost as nearly as this may be ascertained.

Calculating Cost of Irrigation Water Pumped with Farm Equipment.—The data required to calculate the cost of irrigation water obtained from a farm pumping plant are:

- First cost of plant: Well, pump, motor or other power, installing, fittings, housing.
- Capacity of plant: in gallons per minute or some other measure.
- Annual use: In days and in total quantity of water produced.
- Operating costs: For electricity (or gasoline), oil, repairs, supervision, oiling, taxes, insurance, etc.
- Overhead: Interest and depreciation on various units of plant—pump, motor, well, housing, etc.
- Total annual costs and charges.
- Cost per acre foot or other unit of measure.

The cost of water pumped with such equipment is a combination of operating outlays and overhead costs, and is made up of: Interest on investment; depreciation; maintenance, including repairs; taxes; insurance; outlays for power, oil, greases, and supervision.

Since a pumping plant is made up of four units, the rates of which may vary, the calculating should be figured for each of (a) well; (b) motor or engine; (c) pump and connections; and (d) housing.

The following example indicates the various items which should receive consideration, together with an example illustrating the various steps in calculating:

The calculations are for a pumping plant which produces 1,000 gallons per minute, from a well 12 inches in diameter and 200 feet deep, equipped with a 6-inch centrifugal driven by a 15-hp. motor. The plant is utilized a total of 54-1/2 days of 12 hours to irrigate 80 acres of growing crops with an annual average of 1.5 acre-feet per acre.*

Operating Costs:

Taxes on pumping plant, average annually	\$ 7.00
Insurance on plant, average annually	12.00
Operating costs:	
Power, annually (including demand charge)	351.34
Oil and grease	11.00
Repairs, average annually	45.00
Supervision, 14 man hours at 80 cents	11.20
Other expenses	0.00

*Details: 240 acre feet = 39,204,000 gallons (43,560 square feet per acre x 120 x 7.5) at 1,000 gallons per minute requires 654 hours of pumping or 54.5 days of 12 hours.

The Well:

Cost of drilling, casing, and completing	\$700.00
Estimated life	30 years
Annual rate of depreciation (first cost divided by estimated years of life)	\$ 21.21

Annual charge for use of well:

Depreciation	\$21.21
Interest on average value at 4 per cent/yr.	14.00
Total charge for use of well	\$35.21

The Motor:

Cost, installed complete with starter, switch box, wiring transformer, etc.	\$330.00
Estimated life	15 years
Annual rate of depreciation (first cost divided by estimated years of life)	\$ 22.00

Annual charge for use of motor:

Depreciation	\$22.00
Interest on average value at 4 per cent/yr.	6.60
Total charge for use of motor	\$28.60

The Pump:

Cost installed	\$380.00
Estimated life	20 years
Annual rate of depreciation (first cost divided by estimated years of life)	\$ 19.00

Annual charge for use of pump:

Depreciation	\$19.00
Interest on average value at 4 per cent/yr.	7.60
Total charge for use of pump	\$26.60

Housing:

Cost when built	\$120.00
Estimated life	20 years
Annual rate of depreciation (first cost divided by estimated years of life)	\$ 6.00

Annual charge for shelter:

Depreciation	\$ 6.00
Interest on average value at 4 per cent/yr.	2.40
Total charge for use of shelter	\$ 8.40



Recapitulation:Annual Charges:

Taxes	\$ 7.00
Insurance	12.00
Power	351.34
Oil & grease	11.00
Repairs	45.00
Supervision	11.20
Other general expense	0.00
Use of well	35.21
Use of motor	28.60
Use of pump	26.60
Housing	8.40

Total cost	\$536.35
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Cost per Hour:

Number of hours plant runs annually	654 hours
Cost per hour (total cost divided by annual use)	\$0.82

Cost per Acre:

Number of acres plant serves annually	80 acres
Cost per acre (total cost divided by number of acres served)	\$6.70

Cost per Acre Foot:

Number of acre feet plant delivers during pumping period	120 acre ft.
Cost per acre foot (total cost divided by number of acre feet)	\$4.47

Examples of Cost of Water from Farm Pumping Plants.—Costs of water for 17 individual farm pumping plants are summarized in Table 11, nine being centrifugal pumps and eight turbines.

Table 11

COST OF OPERATING FARM PUMPING PLANTS*

	Original cost	Size of pump (inches)	Size of engine or motor (hp.)	Lift (ft.)	Output cu. ft. per sec.	Total annual use (hrs.)	Total annual output (acre ft.)	Total annual cost**	Cost per acre foot of water
Centrifugal pumps									
Plant 1	\$1,100.00	5	10	40	0.67	570	31.9	\$ 263.09	\$9.59
2	750.00	6	15	40	1.75	955	139.5	370.83	2.81
3	1,500.00	7	30	42	2.27	1,366	258.3	704.93	2.91
4	2,450.00	8	35	43	2.40	1,710	342.0	1,058.65	3.31
5	1,235.00	5	10	46	1.05	631	59.6	350.35	6.42
6	800.00	5	10	50	1.10	2,417	221.3	693.03	3.25
7	1,000.00	5	20	44	1.46	362	44.0	231.60	5.95
8	2,405.00	5	20	10	1.93	3,910	712.0	719.34	1.81
9	1,350.00	5	10	28	1.41	872	102.8	341.53	3.72
Averages	\$1,400.00	5	18	38	1.56	1,422	212.4	\$ 525.93	\$4.42
Turbine pumps									
Plant 10	\$2,450.00	12	25	45	1.91	1,246	198.0	\$ 787.39	\$ 4.35
11	2,450.00	12	50	45	2.53	1,740	365.0	1,116.89	3.26
12	2,225.00	12	20	60	1.26	319	33.5	423.96	14.76
13	2,590.00	12	25	73	1.64	627	62.8	585.25	10.63
14	1,500.00	5	30	29	1.96	820	134.0	497.32	4.04
15	3,300.00	8	30	48	2.82	454	106.6	720.76	7.70
16	2,000.00	4	20	70	0.48	937	37.8	477.21	14.20
17	4,400.00	10	40	207	0.48	1,910	76.4	1,478.80	21.08
Averages	\$2,614.00	9	30	72	1.64	1,007	126.8	\$ 760.95	\$10.25

*Data from Bulletin No. 8, State of California, Department of Public Works

**Including overhead, with interest figured on average investment

Measurement of Irrigation Water

Acre inches, their equivalent in gallons, and pump capacity in gallons per minute, necessary to deliver the stated quantities of water in one day of 8 hours, are indicated in tabular form below. To find total needs multiply by number of acres to be served. If run for 24 hours, divide "gallons per minute" by 3.

Acre inches	Gallons of water	Gallons per minute for 8 hours
1	27,152	56
2	54,304	113
3	81,456	169
4	108,608	226
5	135,760	282
6	162,912	339

Note: Proper allowance must be made for evaporation and seepage from the ditches, between the pump and the field, which vary according to climatic and soil conditions.

Conversion Factors for Measurement of Irrigation Water:

1 second foot equals 1 cubic foot per second, equals 450 gallons per minute, equals about 1 acre inch per hour.

1 cubic foot of water equals 7.48 gallons.

A body of water under a head of 4 inches delivers through a hole 1 inch square 1/50 of a second foot per second.

Legal miner's inch (California statutes 1901) equals 1-1/2 cubic feet per minute, measured under a 6-inch pressure and is equivalent to a flow of 11-1/4 gallons per minute, or 1/40 cubic foot per second.

In practice a miner's inch equals 9 gallons per minute, equals 1/50 cubic foot per second.

1 acre inch equals 27,152 gallons, and will be supplied by a flow of 1 miner's inch in 50.4 hours.

Formula for Measuring Irrigation Water:

1. Water measurement unit—Cubic feet per second or second-feet

$$\frac{\text{Number second-feet} \times \text{hours run}}{\text{Number acres}} = \text{Acre-inches per acre or inches depth on whole area}$$

2. Water measurement unit—Southern California Miner's inch = 1/50 second-foot or 9 gallons per minute

$$\frac{\text{Number Miner's inches} \times \text{hours run}}{50 \times \text{number acres}} = \text{Acre-inches per acre}$$

3. Water measurement unit—Statutory inches = $1/40$ second foot or $11-1/4$ gallons per minute

$$\frac{\text{Number Miner's inches} \times \text{hours run}}{40 \times \text{number acres}} = \text{Acre inches per acre}$$

4. Pump—Gallons per minute

$$\frac{\text{Gallons per minute} \times \text{hours run}}{450 \times \text{number acres}} = \text{Acre-inches per acre}$$

Data for Use in Calculating Costs of Operating Pumping Plants.—Costs incurred in the operation of pumping plants are found to vary through wide extremes. The following are average figures compiled from data obtained from Farm Management investigations conducted by the authors.

Item	Gas engines	Motors	Pump
Depreciation—based on total working life of	12,000 hours	20,000 hours	11,000 hours
Attendance—per day of operation.....	20 minutes	15 minutes	...
Repairs—per hour of operation.....	1/2 of first cost ÷ 12,000	1/3 of first cost ÷ 20,000	1/4 of first cost ÷ 11,000
Fuel consumption—per hour of operation	1/6 gal. per H.P.	9/10 Kilowatt per H.P.	
Oil and grease—per day of operation.....	8¢ per H.P.	1/2¢ per H.P.	

Taxes on pumping plants are $15/100$ of 1 per cent of average value

Depreciation

Slip-joint Irrigation Pipe

Used once per year..... 5 to 10 per cent
 Used 2 or 3 times per year..... 5 to $12-1/2$ per cent
 Used 4 or 5 times per year..... $7-1/2$ to 15 per cent

Wells..... 3 to 5 per cent

Rule for calculating cost of power for given plant:

The rule for calculating power needs is as follows:

$$\frac{\text{Rated H.P.} \times 100 \times 0.746 \times \text{hours run}}{\text{Efficiency of motor (stated in per cent as 45, 50, 55)}} = \text{Kilowatt hours}$$

Note: Pumps usually rate about 50 per cent efficiency: In such cases rule is
 $\text{Rated H.P.} \times 0.746 \times \text{hours run} \times 2 = \text{K.W. hours}$

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Example: A 10 H.P. motor is to run for 85 days of 10 hours. What are the power requirements?

Answer: $10 \times 100 \times 0.746 \times 850 \div 50 = 12,680$ kilowatt hours.

or (if plant efficiency is 50)

$10 \times 0.746 \times 850 \times 2 = 12,680$ kilowatt hours.

A simple method of figuring is based on 1 acre foot lifted one foot with 100 per cent pump efficiency requires 1.03 K.W. hours, from which various amounts of water under various efficiencies can be readily determined.

Current schedule of power rates are then consulted and the required power reduced to a dollar basis, thus:

Example: For a 10 H.P. motor a total of 12,680 K.W. hours is to be used under a schedule which calls for:

Demand charge \$8.40 per H.P.

Power charges of

First 1000 K.W. hours, per H.P. at 1.75¢

Next 1000 K.W. hours, per H.P. at 0.85¢

Thereafter, 1000 K.W. hours, per H.P. at 0.60¢

Answer: Demand charge \$ 84.00

Power:

First 10,000 K.W. hours at 1.75¢ \$175.00

Next 2,680 K.W. hours at 0.85¢ 22.78

Total power bill \$281.78

Determining Required Horsepower:

$$\text{H.P.} = \frac{\text{gallons per minute} \times \text{total lift (in feet)} \times 100}{3960 \times \text{efficiency (stated in per cent as 40, 45, 50)}}$$

Example: Horsepower required to lift 600 gallons per minute, total lift of 30 feet.

Answer: $\frac{600 \times 30 \times 100}{3960 \times 45^*} = \frac{1,800,000}{178,200}$ or approximately 10 H.P.

Output of Pumps:

Horizontal Centrifugals.—Although the output varies with different makes, with life, and with local conditions, the following is indicative:

Size of pump**	Rate of discharge	Size of pump**	Rate of discharge
1"	40 g.p.m.	5"	800 g.p.m.
1½"	80 g.p.m.	6"	1100 g.p.m.
2"	140 g.p.m.	7"	1450 g.p.m.
2½"	200 g.p.m.	8"	1650 g.p.m.
3"	300 g.p.m.	10"	2600 g.p.m.
4"	500 g.p.m.	12"	3600 g.p.m.

*Usual efficiency

**Diameter of discharge

Turbine Pumps.—The capacity of deep well pumps is influenced by make, lift, speed, type and number of bowls. The following is, however, indicative:*

Size of pump	6"	8"	10"	12"	14"
Gallons per minute	50-225	100-450	250-1,000	350-1,600	560-2,000

Costs of Applying Water.—This cost is based on use of any one of:

- A. Slip-joint irrigating pipe
- B. Furrows, from ditches
- C. Basin checks, from ditches

There is a wide range in practice, size of head, slope of land, proper preparation of land for handling irrigation water, seepage losses, skill of irrigator, etc., hence this narrowing down to a few representative practices, though useful, is by no means final. Six acre inches of water per application have been selected as a basis for calculating costs.

Under these various conditions, the cost of applying is:

Method	Size of stream (delivered)	Size of crew	Costs per 6 acre inches		Total per time for 6 acre inches
			Man labor at 85¢ per hour	Other charges**	
A	600 g.p.m.	1	\$3.65	\$2.61	\$6.26
A	900 g.p.m.	1	2.55	2.61	5.16
B	900 g.p.m.	1	2.55		
B	1,200 g.p.m.	1	1.90		
B	1,800 g.p.m.	2	2.55		2.33
C	1,200 g.p.m.	1	2.12		
C	1,800 g.p.m.	1	1.42		
C	3,000 g.p.m.	2	1.70		1.75

Cost of Maintaining Farm Ditches.—The cost of maintaining farm irrigation ditches and structure varies widely from farm to farm depending upon the amount, size, and type of ditch required to distribute water over the farm, the amount and kind of weeds prevalent in the community, amount of damage to ditch banks performed by gophers, squirrels, etc., and the frequency of irrigation during the season. The usual procedure in maintaining open ditches is to plow, disk, or chop weeds by hand in the ditch bottoms and on the banks and in some areas scrape the ditches with a "V" scraper. The number of times the operation is repeated during the season is determined by local and seasonal conditions.

*From page 6 of "The Irrigation of Alfalfa, Border or Strip Check System" by J.B. Brown, University of California, Agricultural Extension Service.

**Hauling, distributing, laying, and removing pipe each time at 2 man-days (at \$6.25); use of tractor and trailer \$3.00; total cost per day \$16.50 per 20 acres per time (cost per acre 83 cents), and use of pipe (\$1.20 per time); later figured thus: Estimated use: 1,200 feet for 20 acres; cost: \$900; number times used per year: average of 4 (2-3 for fruits, 4-6 for alfalfa); life: 10 years, or 40 times; interest charge per year: \$22.50; depreciation charge per year: \$90.00; repair charge per year: \$20.00; taxes, nil; insurance, nil; total: \$142.50; annual cost per acre: \$7.12; cost per acre per time: \$1.78.

Table 12

CHARGE FOR UPKEEP OF DITCHES AND HEADGATES

	Charge per acre
1. Plowing ditches (based on 1/4 mile of farm ditch/20 acres) 1 man at \$1.00; 20 T at \$1.48 per hour; ditcher at 17¢ per hour—total of 0.1 hour per acre.....	\$0.26
2. Charge per acre for use of headgates and outlet boxes (Investment per acre—\$9.40 Annual charge made up of depreciation, \$1.09; upkeep, \$0.24; taxes and insurance, negligible; total	1.33
3. Maintenance of main laterals—assessed at \$0.50 per acre.....	0.50
Total annual charge per acre.....	\$2.09

Amount of Spray per Tree:	Amount
Mature trees, dormant	Medium size 4 to 6 gallons per tree Large size 6 to 10 gallons per tree
Mature trees, full leaf	Medium size 5 to 7 gallons per tree Large size 6 to 8 gallons per tree
Mature trees, full leaf "drenched"	Medium size 8 gallons per tree Large size 10 gallons per tree
Grape vines	Dormant 1-1/2 gallons per vine In leaf 1 gallon per vine

Table 13

WEIGHTS PER BUSHEL

Pounds	Pounds
Field crops	Truck crops (cont.)
Alfalfa seed 60	Onions 56
Barley 48	Peas (green) 32
Beans (baby limas) 60	Peppers (green) 22
Beans (limas) 56	Potatoes (Irish) 60
Beans (others) 60	Potatoes (sweet) 55
Corn (shelled) 56	Spinach 12
Oats 32	String beans 24
Peas (dry) 60	Tomatoes 56
Rye 56	Turnips 55
Rice (rough) 45	
Sorghum (grain) 56	Fruits
Wheat 60	Apples 48
	Apricots 48
Truck crops	Cherries 56
Beets 60	Peaches 48
Carrots 50	Pears 48
Cucumbers 48	Plums 48

Part III

TYPICAL COSTS OF PRODUCING SELECTED CROPS

Explanations.—The diversity of soils, climatic conditions, topography, noxious weeds, insects, and plant diseases, yields, size of holdings, cultural practices, and farm equipment, combined with a wide variation in cost items—hired labor, contract work, taxes, etc., prevent any tabulation that can even approximately serve as an example of the inputs and costs involved in producing any California crop. However, examples are presented, in detail, in order to:

1. illustrate use of the various data presented in Part II above;
2. indicate practices deemed desirable in connection with each crop discussed;
3. provide data in a form permitting easy revision to better fit a specific farm or condition; and
4. show in a general way the man-labor, tractor use, equipment use, etc., involved in adding an enterprise to a given farm program.

The data are given for crops produced primarily for sale—not for farm use such as feed, seed, soil maintenance and improvement. Hence the pages which follow present examples indicating application of the various detailed data set forth under Part II plus other essential information such as number of pounds and cost of seed, number and cost of plants, number and cost of market packages, etc., to illustrate the method of determining the cost of producing a given crop. In each example the acre is used as a unit, all costs being calculated to this basis. Although all items in the various detailed examples are recorded on an acre basis, the basic costs of horses, tractors, trucks, implements, etc., are figured on efficient use. Thus the data apply to an acreage actually in a crop of sufficient size to qualify as a commercial enterprise.

The yield of a given crop varies markedly with the prevailing environmental conditions of climate, soil, topography, available water, quality of water, prevalence of various pests—weed, insect, fungous, bacterial, etc.; with availability and competency of required labor; with market availability and receptivity; and with operator training, experience, and ability. In this Manual yields are classified as "usual," "good," and "exceptional." All are based on conditions which permit of commercial production, in the hands of reasonably competent farm operators, and under conditions fairly free from adverse biological influences. Usual yields are roughly those obtained by about 50-60 growers out of 100; good yields by 10-12 growers, and exceptional yields by 4-5 growers. The remaining growers produce less than usual yields. In general, usual yields approximate the average for the state. Operations, as listed, are based on

practices conducted by experienced growers of a given crop. They tend to reflect operations somewhat above the usual. Thus this Manual is not necessarily a mirror of practices as conducted by California producers, but rather a basis for calculating costs resulting from use of good practices designed to produce an income sufficient to justify the continuing or inclusion of a given crop in a farm program.

General information is given in connection with each example. This information gives data concerning the principal producing areas,* environmental requirements, yields, age to self-sustaining crop (for perennials), age to full production, estimated length of productive life. The age to self-sustaining crops refers to the time when yields from maturing plantings are sufficient to pay expenses—both operating and overhead. It is the age when a given orchard, grove, vineyard, or other perennial produces a crop which under normal price conditions yields sufficient income so that the returns balance expenses. While our data indicate a definite age, this age may, and frequently does, vary with variety, size of trees at time of planting, environment conditions, distance between trees or vines, intercropping programs, and amount of proper care given to preparing land, setting out trees, and subsequent cultivating, pruning, pest controlling, irrigating, etc.

The age to full production indicates the time when perennials have reached the beginning of their maximum output. Increases do occur beyond the age indicated, but at a decreasing rate. Estimated length of productive life, as applicable to perennials, is given as the total age when production declines to a point that replacement or elimination of the perennial plants, trees, or vines is in order. Depreciation, a cost item, is figured on the net cost of bringing a perennial into self-sustaining production divided by the number of years elapsing from the age of full production until the end of the estimated productive life. These figures do not include interest on moneys so expended nor a charge for use of land. Any returns from intercrops are deemed a return for use of the land and are not included as a credit to the orchard, vineyard, or grove where so grown; but number of years of returns from first crops of fruit are fully credited. This net cost divided by estimated productive life, after full production is reached, results in the figure of depreciation as used in the various tables below.

The detailed examples are more or less explanatory within themselves. Each is calculated for good yields. The use of the word "cost" may, however, be somewhat clouded. In these examples cost is synonymous with required income to meet various demands for repaying expenditures of labor, materials, and use of capital, because interest is included, and proper accounting procedure may rightly specify that interest is a profit and not a cost. No exception is here taken to that contention, but since most business farmers desire that returns be sufficient to cover interest and depreciation as well as cash out-of-pocket expenses, each example is carried out to show what must be forthcoming in the way of total income if the business is to be deemed fully self-sufficing.

Each example carries a discussion of the various operations basic to the producing of the selected crop. In describing soil improvement practices by use of plants grown to turn under and thus add to the organic and plant food content of the soil, the terms "cover crop" and "green manure crop" are used interchangeably. More correctly a cover crop is one grown to protect from soil erosion or to otherwise retain soil in place, while a green manure crop is

*Largely from publications of the California Cooperative Crop Reporting Service and Federal-State Market Reports.

one plowed under to improve soil conditions. In California, however, most growers use the term "cover crop" to signify green manuring, and this practice is followed in the discussions appearing in connection with each example of costs. Each reflects various ways of preparing for marketing (namely, canning, dried, and fresh fruits; canning and fresh vegetables, etc.) In the cost determinations each example is divided into the four categories of (a) labor and use of equipment; (b) contract work; (c) materials; and (d) miscellaneous charges. Under labor and use of equipment data are given of crew and equipment selected to perform each operation, and day's work (9-hour day). Crews and equipment are selected to fit crop conditions, for commercial and reasonable sized operations. Many farm operators must work with equipment at hand, and this in turn determines the cost and output per day, and cost per acre. For some operations the resulting cost may prove expensive or out-of-line. When such conditions arise determining specific data applicable to a given farm should replace the figures set forth in this Manual. The amount of output per day is largely drawn from Table 3 with minor adjustments to fit specific conditions. Under miscellaneous data are given for taxes, management charge, depreciation, and interest. Taxes are an approximate figure and only roughly indicative, since taxes vary materially between different localities. Depreciation is figured after the method already described above. Management charges are drawn from Table 4. Interest is uniformly figured at 4 per cent. The basis of value upon which interest is figured is the productive value of the land—that is, the figure at which, if owned or acquired, interest may fairly be charged. Thus the productive value ignores any material increment for homes or enhancement in anticipation of a speculative increase in current market prices. Figures of land value are of necessity only approximate. They represent growers' ideas of what land (plus trees of alfalfa or other perennial planting) is worth for strictly farming purposes. As a rule, especially for lands located in suburban and highly populated localities, the productive value tends to be less than the current asking price for farm lands.

All examples of costs are figured for good yields; use of good cultural programs; efficient use of man labor, motive power, and farming equipment; and reasonable cost of water and other materials. As a result, these examples reflect costs that are somewhat lower than would be costs calculated on smaller yields; less acceptable cultural programs; inefficient use of man labor, motive power, and farming equipment; and high costs of irrigating water, other materials, taxes, and other cost items. Costs as presented in this Manual are standards of possible achievement rather than average applications to the enterprise as generally conducted throughout the entire state.

Abbreviations.—The meaning of the various abbreviations as used in the cost tables is as follows:

M/D	Man day (9 hours unless otherwise stated)
H/D	Horse day (9 hours unless otherwise stated)
M/hrs.	Man hours
10T	Tractor (10/15 horse-power)
20T	Tractor (20/30 horse-power)
1-1/2Tr	Truck (1-1/2-ton capacity)
10"	Ten inches
10'	Ten feet
2x	Two times (refers to number of times a given operation is performed)

Comparing Costs and Selling Prices of Farm Products.—A comparison of price returns and costs of production will, in some cases, indicate that price returns are below costs. The question then arises "How do farmers continue in business under these conditions?" There are several reasons. First, they may not receive the rates for work done by them which have been assigned as costs in these examples. Diversification may help, in that some crops bear the burden of losses sustained by others. In some cases growers are living upon their capital, especially sums set aside for depreciation. They also gain the benefits of the changes for management and interest. In some cases more use of equipment may reduce the charge as used in these examples. Each farm is thus a problem to itself and requires first-hand data if a true picture is to be gained.

Application to Specific Farms.—If the data as set forth in this Manual apply to a given farm, it will be a case of accident rather than of design, since costs vary markedly from farm to farm. If similar data are desired for a given property ALL the data set forth herein should be reviewed and if necessary revised. This revision begins with a study of pertinent basic costs which appear herein, including cost of operating tractors, cost of using work animals, and charge for use of equipment. Yields must be determined. Calendars of operation must be revised, and local costs more pertinent substituted for those shown herein.

Items subject to special adjustments are amounts and costs of irrigation water; amounts, numbers, and kinds of sprays and dustings; amount of seed planted per acre; kinds and amounts of fertilizers; method of pruning as this affects costs; etc. Rate of work may require adjusting. Heavy soils tend to lessen the output per day or to increase the cost of motive power. Likewise rolling topography may lessen the output, increase the cost, or require special types of farming implements. Heavy growth of weeds will increase cost of control measures. The same is true of unusual prevalence of insects or plant diseases. Inefficient labor, old work animals, inadequate equipment will increase costs. Irregular and small-sized fields are liable to be more expensive to handle than large, well-planned fields. Other variations are also liable to influence the various cost items. However, such adjustments are not difficult, if local or more pertinent data of yields, cultural programs, use of man labor, motive power, and other items comprising costs are substituted for the data given in our examples.

Final Decision Rests on Farm Testing.—Whether or not a given crop shall be expanded, reduced, discontinued, or replaced by some other crop cannot be decided merely on the acre showing a promising program resulting from the acre (unit) test, which must be followed by two farm tests. These are (a) the calendar of operations, or work schedule, and (b) the farm financial statement, or budget. As a result of a quarter of a century of study by the author, these two tests have been found to be the most vital.

The calendar of operations, briefly, is a graphic or tabular presentation setting forth kinds of crops and livestock, acres or numbers; kinds of operations; time limits when the work must be performed; days available for each task; nature of equipment; size of crews; rate of work; total days required to perform each task; totals of operator labor, hired man-labor, use of horses, tractors, etc.; and memoranda of required supplies. Such calendars are analyzed to determine labor requirements, motive power, implements and machines, use of operator labor, gaps and conflicts, all leading to a determination of efficiency in the use of labor (including that of the operator), land (farm organization), and equipment.

The farm financial statement is a tabular presentation of income and expenses, both operating and overhead, drawn up in detail for a given period of time, usually one year, to determine the probable net income, and to provide data for analyzing sources and amounts of income and kinds and amount of expenses, with a view to pointing ways to improvements, or to indicate the possible outcome of a current or contemplated farming program, based on the entire farm business.

For a full treatment of these two tests, see Chapters 12, 13, and 14 of "Farm Organization," (mimeographed) by R. L. Adams, or Bulletin 544 of the California College of Agriculture, "Tests of Farm Organization—Turlock Area."

Improved Methods.—The following practice is not widely enough adopted to be included in the examples but will probably be important in the future and should be considered when using the examples given.

Weed Control with Chemicals.—The use of chemicals for control of weeds is being used successfully in orchards and vineyards and on carrots and cereal grains, particularly rice.

Cost of control using oil is as follows using 1M 10T and 20 foot spray boom doing 40 acres per day.

Labor	0.2 M/hrs at \$1.00	\$0.20
Tractor	0.2 hrs at 0.72	0.14
Sprayer	0.2 hrs at 0.12	0.02
Oil	60 gals at 0.10	6.00
Total cost per acre		\$6.36

Using 2, 4-D instead of oil would result as follows: 1-1/2 lbs., 2, 4-D at \$1.85 plus 2 gallons Diesel oil at 12 cents or cost of \$3.02 for spray material instead of \$6.00.

Spraying by airplane amounts to about \$1.25 per acre plus cost of material, i.e., \$1.25 plus \$2.93 or \$4.18 using 2, 4-D.

The County Farm Advisor should be contacted before spraying for weeds because oil and 2, 4-D are not completely interchangeable for different crops.

Examples of Costs of Producing Selected Crops

ALFALFA HAY

Principal Producing Areas

Grown generally throughout the state. The counties of largest acreage in order of importance are Imperial, Fresno, Merced, Tulare, Kern, Stanislaus, Los Angeles, San Joaquin, Kings, and Riverside.

Environmental Requirements

Soil.—Three feet or more in depth; fertile; well-drained; loams preferred; well supplied with organic matter; free from acidity or alkali, hardpan or gravel streaks, and high water table.

Climatic Conditions.—Relatively long frost-free growing period (6-10 months); minimum temperatures during growing season of not less than 50 degrees; ample sunshine; freedom from rains during harvesting.

Topography.—Since irrigation is essential, land level enough for basin or contour checking is a requirement.

Yields Per Acre

Usual	5 tons
Good	8 tons
Exceptional	12 tons

Age to Full Production.—Second year after planting.
Productive Life.—Usually until 4 to 5 years old.

Example of Cost of Producing Alfalfa

Based on a mature stand in full production, level land, properly checked for handling irrigation water; water from a community ditch or farm pumping plant.

INPUTS PER ACRE FOR ALFALFA PRODUCTION

Yield 8 tons

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Irrigating (6 times)	3 M/hrs.		18.0	
Upkeep of ditches	1M 10T disk and V scraper		0.2	0.2
Harvesting (6 times)				
Mowing	1M 10T 7' mower	22.0	2.4	2.4
Raking	1M 10T 10' side delivery rake	22.0	2.4	2.4
Baling	3M 10T 2-wire pickup baler	25.0	7.2	2.4
Hauling from field (6 times - 3 miles each time)	2M 1-1/2 Tr. bale loader	18.0	6.0	
Total truck miles 18.0	Total hours per acre		36.2	7.4

COST PER ACRE FOR ALFALFA PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Irrigating	18.0	\$0.85	\$15.30
Tractor and truck driver	10.4	1.00	10.40
Other labor	7.8	0.85	6.63
Total cost of labor			\$32.33
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	7.4	0.72	5.33
Truck (18.0 miles at 12.1¢)			2.18
Tractor mower 7'	2.4	0.10	0.24
Side delivery rake 10'	2.4	0.15	0.36
Pickup baler - 2 wire (30 tons per 10-hr. day)	2.4	0.82	1.97
Bale loader	3.0	0.10	0.30
Headgate and outlet boxes*			1.33
Total cost of power units and equipment			\$11.71

*Investment \$9.40, depreciation \$1.09, upkeep \$0.24

COST PER ACRE FOR ALFALFA PRODUCTION

CONTINUED

	Cost
<u>Materials</u>	
Irrigation water: 3 acre ft. at \$2.00 per acre ft.	\$ 6.00
Bale ties at 50¢ per ton of hay	4.00
Total cost of materials	\$10.00
<u>Miscellaneous</u>	
Taxes	6.00
Depreciation of alfalfa: \$30 to establish, 4 yrs. productive life	7.50
Management	15.00
Interest: 4 per cent of \$400	16.00
Compensation insurance: \$4.20 per \$100 payroll	0.84
Insurance on alfalfa: 3 months at \$5 per \$100, 8 tons at \$20	2.00
Total miscellaneous cost	\$47.34
Total cost per acre \$101.38	Cost per ton \$12.67

ALMONDS

Principal Producing Areas

Almond production in California is centered in localized areas in the counties as follows: San Luis Obispo, Butte, Colusa, Yolo, San Joaquin, Stanislaus, Contra Costa, and Merced. Total planting slightly over 114,000 acres.

Environmental Requirements

Soil.—Fertile, light, sandy loam or loams, 8-10 feet or more in depth, with no impervious layers of hardpan, heavy clay or intervening gravel streaks; good drainage but not "leachy"; well supplied with organic matter; minimum of alkali or other injurious salts.

Climate.—Warm to hot weather during blossoming, fruiting, ripening, and harvesting, a period extending from the middle of February until into September, or about seven months. Since the almond is one of the earliest blossoming fruits, freedom from spring frosts is essential. Light frosts may be controlled by use of heater pots, but heavy and frequent frosts eliminate the almond as a profitable crop. During the growing season maxima and minima temperatures should not drop much below 50 degrees but may rise to 100 degrees. A minimum of humidity is essential for best results. Although the trees become dormant during the winter months, winter killing may result if minima temperatures fall much below 20 degrees.

When grown under nonirrigated conditions a fairly reliable rainfall of about 20 inches is essential. When irrigated, the amount of rainfall is of importance only as it affects the supply and adequacy of the irrigation supply.

Topography.—Nonirrigated orchards can be grown on rolling topographies if not so steep that cultivation becomes impossible or expensive. Orchards grown on irrigated land must be on topographies that lend themselves to the proper constructing and maintenance of ditches and furrows or basins for controlling the irrigating supplies.

Age to Self-Sustaining Crop.—6-8 years
 Age to Full Production.—10-12 years
 Estimated Productive Life.—Until 40-45 years old

Example of Cost of Producing Almonds

Based on mature orchards of paper-shell varieties, established on level valley land containing 50 trees per acre, irrigated from a community ditch or farm pumping plant.

INPUTS PER ACRE FOR ALMOND PRODUCTION

9-Hour Day Yield per acre 1,000 pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Pruning	7 M/hrs.		7.0	
Removing brush	2M 20T brush sled	10.0	1.8	0.9
Broadcasting cover crop	2M 20T broadcaster	40.0	0.4	0.2
Harrowing 2 times	1M 20T 16' spike-tooth harrow	40.0	0.4	0.4
Spraying 2 times	3M 20T 400 gal. sprayer	10.0	5.4	1.8
Fertilizing	2M 20T broadcaster	40.0	0.4	0.2
Disking 6 times	1M 20T 8' double disk	20.0	2.7	2.7
Establish ridges 2 times	1M 20T disk ridger	15.0	1.2	1.2
Irrigating 2 times	4 M/hrs. per acre per time		8.0	
Dragging 2 times	1M 20T 16' drag	40.0	0.4	0.4
Preparing for harvest	9 hrs. per 50 acres		0.2	
Knocking	4M 20T sled (10-hr. day)	2.0	20.0	2.5*
Hauling to huller (1 mi)	1M 1-1/2 truck	6.0	1.5	
Hulling	1M 4W huller (8-hr. day)	3.0	2.7 M 10.8 W	
Drying (30 per cent of crop)	2 M/hrs. per ton		0.3	
Hauling to warehouse (3 miles)	1M 1-1/2 truck	12.0	0.7	
Miscellaneous tree care	4 M/hrs.		4.0	
General truck use (10 miles)				
Total truck miles 14.0		Total hours per acre	57.1 M 10.8 W	10.3

*Figured as tractor running 1/4 of time.

COST PER ACRE FOR ALMOND PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Women (on huller)	10.8	\$0.85	\$ 9.18
Tractor and truck driver	10.0	1.00	10.00
Pruning labor	7.0	0.75	5.25
Irrigating labor	8.0	0.90	7.20
Knocking labor	20.0	1.00*	20.00
General labor	12.1	0.85	10.28
Total cost of labor			\$61.91
<u>Power Units and Equipment</u>			
Tractor 20 HP track	10.3	1.48	15.24
Truck (hauling to huller 1 mi., to warehouse 3 mi., general use, 10 mi.) 14 mi. at 12.1¢			1.69
Pruning equipment	7.0	0.01	0.07
Brush sled	0.9	0.05	0.04
Broadcaster	0.4	0.05	0.02
Barrow 18' spike	0.4	0.04	0.02
Sprayer 400 gallon	1.8	0.61	1.10
Disk 8' double	2.7	0.15	0.40
Disk ridger	1.2	0.08	0.10
Drag 16'	0.4	0.02	0.01
Boat, canvas, and knockers	5.0	0.17	0.85
Huller	3.0	0.99	2.97
Total cost of power units and equipment			\$22.51
<u>Materials</u>			
Melilotus seed: 20 lbs. at 12¢ per lb.			2.40
Spray material for 400 gal. 5-5-50 Bordeaux and 800 gal. 3-3-50 Bordeaux: Bluestone, 88 lbs. at 7-1/2¢ per lb.			6.60
Lime, 88 lbs. at 1-1/2¢ per lb.			1.32
Sacks, second hand: 10 at 15¢ each			1.50
Irrigation water: 2 acre ft. at \$2.80 per acre foot			5.60
Ammonium sulphate fertilizer: 500 lbs. at \$53 ton			13.25
Total cost of material			\$ 30.67
<u>Miscellaneous</u>			
Taxes: \$300 valuation at \$4 per \$100			12.00
Management			30.00
Depreciation of trees: \$400 to establish, 40 yrs. productive life			10.00
Interest: 4 per cent on \$1000			40.00
Compensation insurance: \$2.30 per \$100 payroll			0.78
Total miscellaneous cost			\$ 92.78
Total cost per acre	\$207.75	(Credit 1000 lbs. hulls \$50 per ton)	
	5.00 cr		
	\$182.75		
Cost per lb.	18.3¢		

*Mexican Nationals \$1.10 per hour

APPLES

Principal Producing Areas

The Gravenstein, a summer apple, is principally produced in Sonoma County, with about 7,200 acres out of a state total of 7,600 acres. Fall and winter varieties totaling about 18,000 acres are found principally in Santa Cruz and Sonoma counties.

Environmental Requirements

Soil.—Rich, calcareous clay or sandy loam; six feet or more in depth, with heavy but not compact subsoil free from compact or gravelly layers; surface soil mellow, easily tilled, high in organic matter; soil free from alkali or other injurious salts.

Climate.—Trees will withstand low temperatures during the dormant season; during leafing, blossoming, fruiting, and up to harvest the apple favors a warm but not hot climate of pleasant sunny days and warm nights; freedom from strong and drying winds is essential. The growing season occurs from about late March to October, or a period of about 6 to 7 months. Freedom from rains prior to and during harvest is desirable. Minima temperatures during the growing period should not fall below 40 degrees nor rise above 90.

If grown under nonirrigated conditions a rainfall of from 24 to 30 acre-inches annually is needed. If the orchards are irrigated, the amount of rainfall is less important provided the supply and quality of the irrigating supply is satisfactory.

Topography.—Apple orchards are successful on rolling topographies under nonirrigated conditions, if not so steep that erosion gives trouble and cultivation is not too costly. If irrigated, the topography must lend itself to proper preparation and subsequent control of irrigation water.

Yield Per Acre (Mature Orchards)

	<u>Gravenstein</u>		<u>Winter</u>	
	Tons	Packed boxes	Tons	Boxes
Usual	7	300	9	400
Good	12	500	14	600
Exceptional	16	700	28	1,200

Note: If dried, figure 8 pounds of fresh apples produce one pound of dried fruit. Boxes weigh from 44-48 pounds.

Age to Self-Sustaining Crop.—7-10 years.

Age to Full Production.—12-20 years.

Estimated Productive Life.—Until 50-60 years of age.

Examples of Cost of Producing Apples

Examples are given below for both summer and winter varieties of apples, under conditions of good yields based on mature orchards, containing 50 trees per acre. The summer apples are for orchards on rolling, nonirrigated land; the winter apples on level, irrigated land.

Spray Program.—January—500 gallons per acre of 4 per cent dormant oil spray for San Jose scale. Clusterbud stage—500 gallons per acre of 2 per cent lime sulphur for scab and mildew. Calyx stage and 14 days later—2 sprays of 800 gallons per acre each consisting of 4 pounds of lead arsenate per 100 gallons for control of codling moth.

INPUTS PER ACRE FOR SUMMER APPLE PRODUCTION
9-Hour Day Yield 12 tons

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Broadcast cover crop	2M 20T broadcaster	40.0	0.4	0.2
Pruning	60 M/hrs.		60.0	
Removing brush	2M 20T brushburner	6.0	3.0	1.5
Cutting blight	30 M/hrs.		30.0	
Spraying (4 times)	3M 20T 400 gal. sprayer	5.0	21.6	7.2
Banding trees	4.5 M/hrs.		4.5	
Disking (4 times)	1M 20T 8' double disk	20.0	1.8	1.8
Applying fertilizer	2M 20T broadcaster	40.0	0.4	0.2
Thinning	60 M/hrs.		60.0	
Setting props	2M 20T trailer	8.0	2.2	1.1
Distributing picking equipment	2M 20T trailer	3.0	6.0	3.0
Picking	By box			
Hauling (50 mi.)	2M 1-1/2 Tr.	1.6	11.0	
Collecting and storing picking equipment	2M 20T trailer	6.0	3.0	1.5
Collecting props	2M 20T trailer	30.0	0.6	0.3
Sterilizing boxes	1M/hrs.		1.0	
Total truck miles 50.0		Total hours per acre	205.5	16.8

COST PER ACRE FOR SUMMER APPLE PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Pruning and cutting blight	90.0	\$0.85	\$ 76.50
Tractor and truck driver	22.3	1.00	22.30
Spraying	14.4	0.85	12.24
Thinning	60.0	0.85	51.00
General labor	18.8	0.85	15.98
Total cost of labor			\$178.02
<u>Power Units and Equipment</u>			
Tractor 20 HP track	16.8	1.48	24.86
Truck (50 miles at 12.1¢)			6.05
Brush burner	1.5	0.12	0.18
Sprayer 400 gallon	7.2	0.61	4.39
Disk 8' double	1.8	0.15	0.27
Broadcaster	0.4	0.05	0.02
Trailer	5.9	0.05	0.30
Pruning equipment	60.0	0.01	0.60
Props: 240 at \$1.33 per 100			3.19
Picking equipment			10.00
Total cost of power units and equipment			\$ 49.86

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COST PER ACRE FOR SUMMER APPLE PRODUCTION

CONTINUED

	Cost
<u>Contract and Piece Work</u>	
Picking shipping fruit: 510 boxes at 17¢ per box	\$86.70
(If drying fruit figure \$3.00 to \$3.50 per ton)	
Total cost of contract and piece work	\$86.70
<u>Materials</u>	
Dormant spray oil for 500 gal. of 4 per cent spray: 20 gal. at 10¢	2.00
Lime sulphur for 500 gal. of 2 per cent spray: 10 gal. at 13¢	1.30
Lead arsenate for 1,600 gal. of 4 per cent spray: 64 lbs. at 15¢	9.60
Banding material for 50 trees at 4¢ per tree	2.00
Ammonium sulphate fertilizer: 500 lbs. at \$53 per ton	13.25
Vetch seed: 35 lbs. at 12¢	4.20
Sterilizing materials	0.30
Total cost of materials	\$32.65
<u>Miscellaneous</u>	
Taxes	10.00
Management	30.00
Depreciation of trees (\$600 to establish, 40 years life)	15.00
Interest: 4 per cent of \$1000	40.00
Compensation insurance: \$2.30 per \$100 payroll	2.50
Total miscellaneous cost	\$97.50
Total cost per acre \$444.73	Cost per ton \$37.06

 INPUTS PER ACRE FOR WINTER APPLE PRODUCTION
 9-Hour Day Yield 14 tons

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Broadcast cover crop	2M 20T broadcaster	40.0	0.4	0.2
Harrow (2 times)	1M 20T 20' spike harrow	40.0	0.2	0.2
Dormant spray	3M 20T 400 gal. sprayer	4.0	6.6	2.2
Pruning	60M/hrs.		60.0	
Removing brush	2M 20T brush burner	5.0	3.6	1.8
Disking (2 times)	1M 20T 8' double disk	20.0	0.9	0.9
Spraying (3 times)	3M 20T 400 gal. sprayer	3.0	27.0	9.0
Applying fertilizer	2M 20T broadcaster	45.0	0.4	0.2
Thinning	120 M/hrs.		120.0	
Establish borders	1M 20T disk ridger	15.0	0.6	0.6
Irrigating	6 M/hrs.		6.0	
Cultivating (2 times)	1M 20T 8' double disk	20.0	0.9	0.9
Setting props	2M 20T trailer	7.0	2.6	1.3
Distributing picking equipment	2M 20T trailer	13.0	1.4	0.7
Picking	By box			
Hauling to packing shed (60 mi.)	2M 1-1/2 Tr.	1.0	18.0	
Collect and store props	2M 10T trailer	22.5	0.8	0.4
Total truck miles 60.0	Total hours per acre		249.0	18.4

COST PER ACRE FOR WINTER APPLE PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor and truck driver	27.4	\$1.00	\$ 27.40
Pruning	60.0	0.85	51.00
Sprayers	22.4	0.85	19.04
Thinning	120.0	0.85	102.00
Irrigating	6.0	0.90	5.40
General labor	13.6	0.85	11.56
Total cost of labor			\$216.40
<u>Power Units and Equipment</u>			
Tractor 20 HP track	18.4	1.48	27.23
Truck 60 mi. at 12.1¢ per mi.			7.26
Harrow 20' spike	0.2	0.04	0.02
Sprayer 400 gal.	11.2	0.61	6.83
Brush burner	1.8	0.12	0.22
Disk 8' double	1.8	0.15	0.27
Broadcaster	0.4	0.05	0.02
Disk ridger	0.6	0.08	0.05
Trailer	2.4	0.05	0.12
Props—360 at \$1.33 per 100			4.79
Pruning equipment	60.0	0.01	0.60
Picking equipment			1.00
Total cost of power units and equipment			\$ 48.41
<u>Contract and Piece Work</u>			
Picking: 600 boxes at 17¢			102.00
Total cost of contract and piece work			\$102.00
<u>Materials</u>			
Irrigation water: 1 acre-foot at \$3.50			3.50
Dormant spray oil for 600 gal. 4 per cent spray: 24 gal. at 10¢			2.40
Lead arsenate for 2,400 gal. 4 per cent spray: 96 lbs. at 15¢			14.40
Vetch seed: 35 lbs. at 12¢			4.20
Ammonium sulphate fertilizer: 500 lbs. at \$53 per ton			13.25
Total cost of materials			\$ 37.75
<u>Miscellaneous</u>			
Taxes			12.00
Management			30.00
Depreciation of trees (\$600 to establish, 40 years of life)			15.00
Interest: 4 percent of \$1600			64.00
Compensation insurance: \$2.30 per \$100 payroll			4.90
Total miscellaneous cost			\$125.90
Total cost per acre \$530.46	Cost per ton \$37.89		

Cost of Packing Apples

Watsonville Area.—The commercial charge for the standard Northwestern pack in this area is about \$1.50 per packed box. Details making up this charge are: Sorting and wiping, wrapping and packing 75¢ per box; wrapping paper 7.5¢ a box; hauling 2.5 to 3¢ (5 miles) or 3.5 to 4¢ (7 miles) per box; box and lid 40¢; lidding \$1.00 per 100; strapping 3.5¢; (storage 22.5¢ for period August 1 to June 15).

Sebastopol Area.—Commercial packing in this area costs about 85¢ per packed box (Northwestern pack); 55¢ per box for early immature "C" grade apples.

Note.—Weights per field and packed box are about as follows

	<u>Field box (net)</u>	<u>Packed box (net)</u>
Bellflowers	31-32 lbs.	40-41 lbs.
Newtons	37-38 lbs.	46-48 lbs.
Gravensteins	36-38 lbs.	42-46 lbs. (Northwestern pack)
		40-44 lbs. (40-lb. lug "place" pack)

Cost of Drying Apples (Drying ratio 8:1)

Watsonville Area.—\$165 a ton, including container.

Sebastopol Area.—Drying of apples in a commercial dryer in this area involves a total cost of \$140-\$160 per dry ton, including cost of container.

APRICOTS

Principal Producing Areas

California has about 44,000 acres of apricots, of which Santa Clara County is the largest producer with over 15,700 acres. Other counties of production (2,000-4,000 acres) are: Stanislaus, Alameda, San Benito, Riverside, Contra Costa, and Solano.

Environmental Requirements

Soil.—By use of various rootstocks and varieties the apricot has a rather wide adaptability. However, best results are obtained from orchards planted on fine sand or sandy loam soils at least six feet in depth with open, well-drained but not "leachy" subsoils; rich in organic matter and plant foods; free from alkali or other injurious salts.

Climate.—The best climatic conditions are those which are free from early frosts (since the apricot frequently blooms as early as February) and from frosts during the spring months. Warm sunny days with maximum temperatures of not much above 90 degrees, and night temperatures which do not drop much below 50 degrees, are preferable. Freedom from high winds is essential, especially after the fruit begins to "size." The principal fruiting season, from time of blooming until harvest time, is from the middle of February or early March until the last of June or early July. After the fruit is harvested tree growth should continue until well into October. The annual moisture requirements are from 24 to 30 inches, an amount that makes irrigating necessary in most apricot-growing areas.

Topography.—Topography should be level or gently rolling so that adequate irrigating facilities are possible and application of water economical.

Yield Per Acre
(Orchards in Full Production)

Usual	4 tons
Good	8 tons
Exceptional	10 tons

Drying ratio: 5:1.

Age to Self-Sustaining Crop.—4-6 years

Age to Full Production.—7-10 years

Estimated Productive Life.—Until 25-30 years of age

Example of Cost of Producing Apricots

As indicative of the cost of producing apricots, examples are given below for (a) canning apricots and (b) dried apricots, based on mature orchards of 75 trees supplied with irrigation water from either a canal or a farm pumping plant.

INPUTS PER ACRE FOR PRODUCTION OF CANNING APRICOTS
9-Hour Day Yield 8 tons

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Establish basins	1M 20T disk ridger	30.0	0.3	0.3
Irrigating	4M/hrs.		4.0	
Disking (2 times)	1M 20T 7' double disk	15.0	1.2	1.2
Broadcast cover crop	2M 20T broadcaster	40.0	0.4	0.2
Pruning	36 M/hrs.		36.0	
Burning brush	2M 20T brush burner	4.5	4.4	2.2
Spraying (3 times)	3M 20T 400 gal. sprayer	6.0	13.5	4.5
Fertilizing	2M 20T broadcaster	40.0	0.4	0.2
Disking (4 times)	1M 20T 7' double disk	15.0	2.4	2.4
Establish basins (3 times)	1M 20T disk ridger	30.0	0.9	0.9
Irrigating (3 times)	4 M/hrs.		12.0	
Thinning	20 M/hrs.		20.0	
Distribute heater pots	2M 20T sled	15.0	1.2	0.6
Lighting	2.0 M/hrs.		2.0	
Refilling pots (3 times)	2M 20T sled and tank	45.0	1.2	0.6
Removing heaters	2M 20T sled	15.0	1.2	0.6
Setting props	2M 20T trailer	5.0	3.6	1.8
Scatter pick boxes	2M 20T trailer	15.0	1.2	0.6
Picking	Contract			
Grading	8 M/hrs.		8.0	
Hauling	By ton			
Storing props	2M 20T trailer	8.0	2.2	1.1
Misc. tree care	4 M/hrs.		4.0	
Total hours per acre			120.1	17.2

COST PER ACRE FOR PRODUCTION OF CANNING APRICOTS

	Hours	Rate per hour	Cost
<u>Labor</u>			
General labor	30.9	\$0.85	\$ 26.26
Tractor driver	17.2	1.00	17.20
Irrigation	16.0	0.90	14.40
Pruning	36.0	0.85	30.60
Thinning	20.0	0.85	17.00
Picking (contract)			
Total cost of labor			\$105.46
<u>Power Units and Equipment</u>			
Tractor 20 HP track	17.2	1.48	25.46
Disk ridger	1.2	0.08	0.10
Broadcaster	0.4	0.05	0.02
Pruning equipment	36.0	0.01	0.36
Disk 7' double	3.6	0.13	0.47
Sprayer 400 gal.	4.5	0.61	2.75
Brush burner	2.2	0.12	0.26
Trailer	5.3	0.05	0.26
Heaters (depreciation \$3.00, interest 36¢)			3.36
Lug box rent at 75¢ per ton			6.00
Props: 400 at \$1.33 per 100			5.32
Picking equipment			0.42
Total cost of power units and equipment			\$ 44.78
<u>Contract and Piece Work</u>			
Picking: 8 tons at \$22 per ton			176.00
Hauling: 8 tons at \$2 per ton			16.00
Total cost of contract and piece work			\$192.00
<u>Materials</u>			
Vetch seed: 30 lbs. at 12¢			3.60
Spray material for 300 gal. 8-8-50 Bordeaux			
and 450 gal. 4-5-50 Bordeaux: Bluestone, 84 lbs. at 7-1/2¢			6.30
Lime, 93 lbs. at 1-1/2¢			1.40
Irrigation water: 2 acre ft. at \$3.50			7.00
Ammonium sulphate fertilizer: 400 lbs. at \$53 ton			10.60
Heater fuel: 150 gal. at 7-1/2¢			11.25
Spray oil for 300 gal. 3 per cent spray: 9 gal. at 15-1/2¢			1.40
Total cost of materials			\$ 41.55
<u>Miscellaneous</u>			
Taxes			10.00
Management			30.00
Depreciation of trees: \$200 to establish, 20 yrs. productive life			10.00
Interest: 4 per cent of \$750			30.00
Compensation insurance: \$2.30 per \$100 payroll			3.45
Total miscellaneous cost			\$ 83.45
Total cost per acre	\$467.24	Cost per ton	\$58.40

INPUTS PER ACRE FOR PRODUCTION OF DRIED APRICOTS
9-Hour Day Yield 3,200 Pounds Dried (Ratio:5-1)

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Establish basins	1M 20T disk ridger	30.0	0.3	0.3
Irrigating	4 M/hrs.		4.0	
Disking (2 times)	1M 20T 7' double disk	15.0	1.2	1.2
Broadcast cover crop	2M 20T broadcaster	45.0	0.4	0.2
Pruning	36 M/hrs.		36.0	
Burning brush	2M 20T brush burner	4.5	4.4	2.2
Spraying (3 times)	3M 20T 300 gal. sprayer	6.0	13.5	4.5
Broadcasting fertilizer	2M 20T broadcaster	45.0	0.4	0.2
Disking (4 times)	1M 20T 7' double disk	15.0	2.4	2.4
Establish basins (3 times)	1M 20T disk ridger	30.0	0.9	0.9
Irrigating (3 times)	4 M/hrs.		12.0	
Thinning	10 M/hrs.		10.0	
Distribute heaters	2M 20T sled	15.0	1.2	0.6
Lighting	2M/hrs.		2.0	
Refilling pots (3 times)	2M 20T sled and tank	45.0	1.2	0.6
Removing heaters	2M 20T sled	15.0	1.2	0.6
Setting props	2M 20T trailer	5.0	3.6	1.8
Scatter pick boxes	2M 20T trailer	15.0	1.2	0.6
Picking	80 M/hrs.		80.0	
Storing props	2M 20T trailer	8.0	2.2	1.1
Misc. tree care	4 M/hrs.		4.0	
Hauling from orchard (4.0 truck miles)	2M 1-1/2 Tr.	3.0	6.0	
Cutting	By ton			
Drying	80 M/hrs.		80.0	
Sacking	1 M/hr.		1.0	
General truck use (10.0 miles)				
Total truck miles 14.0			Total hours per acre 269.1	17.2

COST PER ACRE FOR PRODUCTION OF DRIED APRICOTS

	Hours	Rate per hour	Cost
<u>Labor</u>			
General labor	26.9	\$0.85	\$ 22.86
Tractor and truck driver	20.2	1.00	20.20
Irrigating	16.0	0.90	14.40
Pruning	36.0	0.85	30.60
Thinning	10.0	0.85	8.50
Picking and drying	160.0	0.85	136.00
Total cost of labor			\$232.56

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COST PER ACRE FOR PRODUCTION OF DRIED APRICOTS

CONTINUED

	Hours	Rate per hour	Cost
<u>Power Units and Equipment</u>			
Tractor 20 HP track type	17.2	\$1.48	\$ 25.46
Truck: 14 miles at 12.1¢			1.69
Disk ridger	1.2	0.08	0.10
Broadcaster	0.4	0.05	0.02
Pruning equipment	36.0	0.01	0.36
Disk 7' double	3.6	0.13	0.47
Sprayer - 300 gal.	4.5	0.61	2.75
Brush burner	2.2	0.12	0.26
Trailer	5.3	0.05	0.26
Heaters (Depreciation \$3, interest 36¢)			3.36
Props: 400 at \$1.33 per 100			5.32
Lug boxes: 150 at 3.5¢			5.25
Picking equipment			0.42
Drying equipment: \$2.10 per fresh ton			16.80
Total cost of power units and equipment			\$ 62.52
<u>Contract and Piece Work</u>			
Cutting: 8 tons at \$16			128.00
Hauling: 1.6 tons at \$1.50			2.40
Total cost of contract and piece work			\$130.40
<u>Materials</u>			
Vetch seed: 30 lbs. at 12¢			3.60
Spray oil for 300 gal. 3 per cent spray: 9 gal. at 15-1/2¢			1.40
Spray material for 300 gal. 8-8-50 Bordeaux			
and 450 gal. 4-5-50 Bordeaux: Bluestone			
Bluestone, 84 lbs. at 7-1/2¢			6.30
Lime, 93 lbs. at 1-1/2¢			1.40
Irrigation water: 2 acre ft. at \$3.50			7.00
Ammonium sulphate fertilizer: 400 lbs. at \$53 ton			10.60
Heater fuel: 150 gal. at 7-1/2¢			11.25
Drying material			5.60
Sacks: 48 at 15¢			7.20
Total cost of materials			\$ 54.35
<u>Miscellaneous</u>			
Taxes			10.00
Management			30.00
Depreciation of trees: \$200 to establish, 20 yrs. of life			10.00
Interest: 4 per cent of \$750			30.00
Compensation insurance: \$2.45 on \$100 payroll			4.90
Total miscellaneous cost			\$ 84.90
Total cost per acre \$564.73	Cost per lb.	17.6¢	

Shipping Apricots: Picking \$20 per fresh ton
Box and lids 30¢ per 20-lb. box
Packing labor 5¢ per 20-lb. box

ARTICHOKES

Principal Producing Areas

Six counties produce the commercial California artichoke crop. In order of importance these are: Monterey, San Mateo, Santa Cruz, San Luis Obispo, Santa Barbara, and Marin.

Environmental Requirements

Soil.—Deep, fertile, well-drained loam or clay loam soils are preferred. The plant is deep rooting and soils at least 6 feet in depth are required. Soils must be free from alkali or other injurious salts. Soils rich in organic matter produce the best results.

Climate.—Climatic conditions suited to the artichoke are characterized by freedom from frost practically throughout the year plus cool, foggy or humid conditions during the spring, summer, and fall. As may be noted, the commercially producing areas are close to the coast and approach the required climatic requirements.

Topography.—Because irrigation is needed to provide a constant and adequate supply of moisture at all times, level land is a requirement, particularly as level lands and suitable soils tend to be found together in the coastal areas where the artichoke does its best.

Yield Per Acre (Plantings in Full Production)

	Pounds	Crates (40 lbs.)
Usual	3,400	85
Good	5,000	125
Exceptional	6,400	160

Age to Self-Sustaining Crop.—First year (namely, plants set in February or March bear buds beginning in September.)

Age to Full Production.—Second year and after

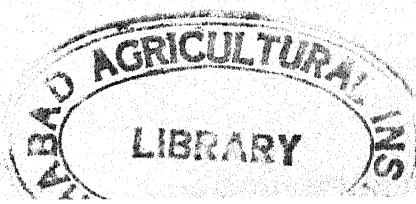
Estimated Productive Life.—Until 3-4 years old. (Although plants will continue to produce for several years the best growers find that renewing by re-planting gives better results than continuing with older plants.)

Example of Cost of Producing Artichokes

Based on a mature planting of 900 plants (6 feet apart in the row, rows 8 feet apart).

INPUTS PER ACRE FOR ARTICHOKE PRODUCTION 9-Hour Day Yield 5,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing furrow each side of row	1M 20T 2' 14" plow	8.0	1.1	1.1
Opening ditch to receive plants	1M 20T ditcher	22.5	0.4	0.4



INPUTS PER ACRE FOR ARTICHOKE PRODUCTION

CONTINUED

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Cutting plants	1M 20T 3' artichoke knife	22.5	0.4	0.4
Placing plants in ditch	3M/hrs.		3.0	
Disking (2 times)	1M 20T 7' offset disk	20.0	0.9	0.9
Ditching for manure	1M 20T ditcher	45.0	0.2	0.2
Furrowing (6 times)	1M 20T furrower double	20.0	2.7	2.7
Irrigating (7 times)	5 M/hrs.		35.0	
Cultivating (6 times)	1M 20T 6' asparagus chisel	20.0	2.7	2.7
Applying fertilizer	1M	10.0	0.9	
Spraying (2 times)	1M hand sprayer	1.0	18.0	
Picking, grading, boxing	72 M/hrs.		72.0	
Hauling from field (2.0 truck miles)	2M 1-1/2 Tr.	2.0	4.5	
Hauling to market General truck use (10.0 truck miles)	By box			
Total truck miles	12.0	Total hours per acre	141.8	8.4

COST PER ACRE FOR ARTICHOKE PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	8.4	\$1.00	\$ 8.40
Irrigating	35.0	0.75	26.25
Picking	72.0	0.75	54.00
Truck driver	4.5	1.00	4.50
General labor	21.9	0.75	16.85
Total cost of labor			\$110.00
<u>Power Units and Equipment</u>			
Tractor 20 HP track	8.4	1.48	12.43
Truck: 12 miles at 12.1¢ per mile			1.45
Plow 2-14'	1.1	0.15	0.16
Ditcher	0.6	0.17	0.10
Artichoke knife	0.4	0.53	0.21
Disk 7' offset	0.9	0.13	0.12
Furrower double	2.7	0.18	0.49
Asparagus chisel	2.7	0.17	0.46
Grader, clamper, packing shed			6.57
Total cost of power units and equipment			\$ 21.99
<u>Contract and Piece Work</u>			
Hauling to market: 2-1/2 tons at \$2.50			6.25
Total cost of contract and piece work			\$ 6.25

COST PER ACRE FOR ARTICHOKE PRODUCTION

CONTINUED

	Cost
<u>Materials</u>	
Manure - spread in field: 5 tons at \$6	\$ 30.00
Ammonium sulphate: 500 lbs. at \$53 ton	13.50
Irrigation water: 1 acre ft. at \$3	3.00
Black leaf 40: 3 quarts at 85¢	2.55
Packing boxes: 165 at 16.8¢	27.75
Paper and nails for boxes: 165 at 3/4¢	1.24
Total cost of materials	\$ 78.04
<u>Miscellaneous</u>	
Taxes	8.00
Management	24.00
Depreciation of plants: \$60 to establish, 3 yrs. of productive life	20.00
Interest: 4 per cent of \$500	20.00
Compensation insurance \$1.24 per \$100 payroll	0.95
Total miscellaneous cost	\$ 72.95
Total cost per acre \$289.23	Cost per 40 lb. box \$2.31

ASPARAGUS

(Delta Conditions)

Principal Producing Areas

Of a total production of about 71,000 acres in California, San Joaquin County has about 54,000. Other counties in order of importance are Contra Costa, Yolo, Sacramento, and Solano counties.

Environmental Requirements

Soils.—Rich, 8 to 10 feet deep, retentive of moisture, porous enough to facilitate drainage, warms quickly in the spring, and loose and friable enough to allow the spears to grow straight upward. Especially adapted to the muck-sediment mixture soils of the Delta region.

Climate.—Relatively cool growing season with cool nights and days of bright sunshine.

Topography.—Level to facilitate irrigation.

Yield Per Acre

Usual	2,000 lbs.
Good	3,000 lbs.
Exceptional	4,000 lbs.

Age to Full Production.—Third Year

Productive life.—Ten years

Example of Cost of Producing Asparagus

Based on a full producing stand on peat soils.

INPUTS PER ACRE FOR ASPARAGUS PRODUCTION 9-Hour Day Yield 3,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Cut tops	1M 30T 15' mower	50.0	0.2	0.2
Rake tops	1M 30T 2-10' rakes	65.0	0.1	0.1
Burn tops	1M	18.0	0.5	
Disking	1M 30T 2-5' double disks	25.0	0.4	0.4
Cultivate (3 times)	1M 15T 5' double disk	18.0	1.5	1.5
Ridge lightly (3 times)	1M 15T 5' ridging disk	18.0	1.5	1.5
Disking	1M 30T 2-5' double disks	25.0	0.4	0.4
Cultivate (4 times)	1M 15T 5' double disk	18.0	2.0	2.0
Ridge (heavily) (4 times)	1M 15T 5' ridging disk	18.0	2.0	2.0
Harvesting	By pound			
Hauling to shed (5 truck miles)	2M 1-1/2 Tr.	3.0	6.0	
Wash, trim, pack	12 M/hrs.		12.0	
Disking	1M 30T 2-5' double disk	25.0	0.4	0.4
Irrigate (4 times)	1M	10.0	3.6	
Cultivate (3 times)	1M 15T 5' double disk	18.0	1.5	1.5
Miscellaneous (30 truck miles)			2.0	0.5
Total truck miles 35.0				
	Total hours per acre		34.1	10.5

COST PER ACRE FOR ASPARAGUS PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
General labor	5.0	\$0.85	\$ 4.25
Tractor and truck driver	13.5	1.00	13.50
Wash, trim and pack	12.0	1.50	18.00
Irrigating	3.6	1.10	3.96
Total cost of labor			\$ 39.71
<u>Power Units and Equipment</u>			
Tractor 15 HP wheel	9.0	0.80	7.20
Tractor 30 HP track	1.5	2.02	3.03
Truck: 35 miles at 12.1¢			4.24
Mower 15'	0.2	0.20	0.04
Rake 2-10'	0.1	0.12	0.01
Disk 5' double	7.4	0.17	1.26
Ridging disk 5'	3.5	0.08	0.27

PER ACRE FOR ASPARAGUS PRODUCTION

CONTINUED

	Cost
<u>Power Units and Equipment (Cont.)</u>	
Packing and equipment (\$16 per acre cost),	
Interest 40¢, Depreciation 80¢	\$ 1.20
Drainage pump including power	4.00
Total cost of power units and equipment	<u>\$21.25</u>
<u>Contract Work</u>	
Cutting: 30 cwt at \$3	90.00
Total cost of contract work	<u>\$90.00</u>
<u>Materials</u>	
Picking boxes: 10 at 50¢	5.00
Irrigation water (included in cost of pump above)	
Crates for market asparagus: 50 at 35¢	17.50
Total cost of materials	<u>\$22.50</u>
<u>Miscellaneous</u>	
Taxes	10.00
Depreciation of asparagus bed: \$180 to establish, 10 yrs. life	18.00
Management	24.00
Insurance: \$40 per 100 acres	0.40
Interest: 4 per cent of \$600	24.00
Compensation insurance: \$1.24 per \$100 payroll	1.00
Total miscellaneous cost	<u>\$76.40</u>
Total cost per acre \$249.86	Cost per pound 8.3¢

Acknowledgment: J. W. Halleen, Asst. Mgr., California Asparagus Growers' Association, Inc., Stockton, California.

AVOCADOS

Principal Producing Areas

Of approximately 15,000 acres of avocado trees principal plantings are in the counties of San Diego, Los Angeles, and Orange with lesser acreages in Ventura and Santa Barbara counties.

Environmental Requirements

Soils.—Preferable soils are fertile, medium textured, well drained, fine sandy loam or loams, four feet or more in depth, and free from noxious alkali or other salts.

Climate.—Avocados (or "Calavos"—a contraction of California and avocados) are subtropical fruits requiring mild climatic conditions throughout the year free from frosts and cool, moderate summers free from violent daily temperature fluctuations; moderately high humidity, freedom from strong winds. Since avocado groves in California are universally irrigated, the time of occurrence and amount of rainfall is unimportant except as it affects adequacy and quality of irrigation supplies.

Usual	1,600 lbs.
Good	3,000 lbs.
Exceptional	7,000 lbs.

Estimated Productive Life.—Not known under California conditions. In this Manual estimated until 40 years of age.

Based on a mature orchard of 35 trees per acre on sloping land, with clean cultivation of terraces. Avocados are grown on land ranging from level to steep slopes requiring expensive terracing, thus resulting in wide differences in cultural operations which must be taken into consideration when using this data. Many of the growers are using nontillage methods of operation and it appears that the use of this system will increase, using either permanent sod or oil sprays for weed control (see section on new methods).

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Disking (2 times)	1M 10T 6' double disk	10.0	1.8	1.8
Broadcasting cover crop	1M hand broadcaster	10.0	0.9	
Harrowing (2 times)	1M 10T 10' spike harrow	12.0	1.5	1.5
Disking (2 times)	1M 10T 6' double disk	10.0	1.8	1.8
Pruning	16 M/hrs.		16.0	
Furrowing (4 times)	1M 10T 4 shovelfurrower	10.0	3.6	3.6
Irrigation (4 times)	6 M/hrs.		24.0	
Cultivating (4 times)	1M 10T 6' double disk	10.0	3.6	3.6
Dusting	1M 10T duster	40.0	0.2	0.2
Applying fertilizer	1 M/hr.	9.0	1.0	
Picking fruit	21 M/hrs.		21.0	
Hauling	By ton			
Miscellaneous tree care	4 M/hrs.		4.0	
Total hours per acre			79.4	12.5

COST PER ACRE FOR AVOCADO PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	12.5	\$1.00	\$ 12.50
Pruning	16.0	0.80	12.80
Irrigation	24.0	0.80	19.20
Picking	21.0	0.75	15.75
Other labor	5.9	0.80	4.72
Total cost of labor			\$ 64.97
<u>Power Units and Equipment</u>			
Tractor 10 HP wheel	12.5	0.72	9.00
Disk 6' double	7.2	0.11	0.79
Spike harrow 10'	1.5	0.02	0.03
Pruning equipment	16.0	0.01	0.16
Hand broadcaster	0.9	0.02	0.02
Furrower 4 shovel	3.6	0.08	0.29
Duster	0.2	0.20	0.04
Total cost of power units and equipment			\$ 10.33
<u>Contract and Piece Work</u>			
Hauling: 1-1/2 tons at \$3			4.50
Total cost of contract and piece work			\$ 4.50
<u>Materials</u>			
Vetch seed: 30 lbs. at 12¢			3.60
Irrigation water: 2 acre ft. at \$22			44.00
Ammonium sulphate fertilizer: 400 lbs. at \$53 ton			10.60
Dusting material (35 pounds) DDT (5 per cent): 1.8 lbs. at \$1			1.80
Sulphur (85 per cent): 30 lbs. at 4¢			1.20
Total cost of materials			\$ 61.20
<u>Miscellaneous</u>			
Taxes			15.00
Management			30.00
Depreciation of trees: \$900 to establish, 30 yrs. of productive life			30.00
Interest: 4 per cent of \$1,200			48.00
Compensation insurance: \$2.30 per \$100 payroll			0.70
Total miscellaneous cost			\$123.70
<hr/>			
Total cost per acre \$264.70	Cost per pound 8.8¢		

BARLEY

Principal Producing Areas

Barley is grown generally throughout the agricultural areas of California. Important acreages are normally planted in the following counties: Kings, Fresno, Yolo, San Joaquin, Colusa, Madera, Riverside, Glenn, Imperial, and Tulare.

Environmental Requirements

Barley has relatively wide acceptable environmental conditions, as already indicated by its wide distribution throughout California under a variety of soil, climatic, and topographical features. However, the more desirable soils are fertile silt loams, 2 or more feet in depth, not subject to standing water during the rainy season, well supplied with organic matter, and free from injurious salts. The more desirable climatic conditions consist of mild, sunny, fairly cool, but not cold weather, for a growing season of 4 to 7 months, the length depending upon the time of year, cool weather during the growing season prolonging the time from planting to maturity, with minima temperatures of about 40 degrees and maxima of about 70 degrees. During maturing somewhat warmer temperatures, viz., up to 85-90 degrees, freedom from unseasonal rains and freedom from shattering winds are essential for best results. About 10-14 inches of water (from rainfall or irrigation) are needed to mature a good crop of quality grain, with the moisture distributed throughout the growing season. Barley will, however, produce crops under cool weather conditions.

Yield Per Acre (Threshed Grain)

	<u>Dry farmed</u>	<u>Irrigated</u>
Usual	1,000 lbs.	1,500 lbs.
Good	1,500 lbs.	2,500 lbs.
Exceptional	1,800 lbs.	3,500 lbs.

Examples of Cost of Producing Barley

Examples are shown for both irrigated and nonirrigated conditions. The majority of the acreage is nonirrigated, however.

INPUTS PER ACRE FOR DRY FARMED BARLEY PRODUCTION 9-Hour Day Yield 1,500 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 30T 4-14" plow	12.0	0.8	0.8
Disking (2 times)	1M 30T 20' single disk	45.0	0.4	0.4
Harrowing (2 times)	1M 30T 20' spike harrow	45.0	0.4	0.4
Seeding	2M 30T 2-10' drills	35.0	0.6	0.3
Harvesting	4M 30T 12' combine	25.0	1.6	0.4
Hauling	Contract			
Total hours per acre			3.8	2.3

COST PER ACRE FOR DRY FARMED BARLEY PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	2.3	\$1.00	\$ 2.30
Seeding	0.3	1.00	0.30
Harvesting	1.2	1.00	1.20
Total cost of labor			\$ 3.80
<u>Power Units and Equipment</u>			
Tractor 30 HP track	2.3	2.02	4.65
Plow 4-14"	0.8	0.27	0.23
Disk 20' single	0.4	0.30	0.12
Harrow 20' spike	0.4	0.05	0.02
Drill 10'	0.6	0.31	0.19
Combine 12'	0.4	1.15	0.46
Total cost of power units and equipment			\$ 5.67
<u>Contract and Piece Work</u>			
Hauling from field to warehouse: 1,500 lbs. at \$2 ton			1.50
Storage: 3 months at 75¢ ton first month			
25¢ ton thereafter: 1,500 lbs. at \$1.25 ton			0.93
Total cost of contract and piece work			\$ 2.43
<u>Materials</u>			
Seed: 80 lbs. at \$2.27 cwt			1.82
Sacks and twine: 15 at 20¢			3.00
Total cost of materials			\$ 4.82
<u>Miscellaneous</u>			
Taxes			3.00
Management			5.25
Insurance: \$1.50 per \$100 per season. Insured at \$45 ton			0.34
Interest: 4 per cent of \$100			4.00
Compensation insurance: \$4.20 per \$100 payroll			0.10
Total miscellaneous cost			\$12.69
Total cost per acre \$29.41 - 50¢ credit for pasturage = \$28.91 or \$1.93 per cwt.			

INPUTS PER ACRE FOR PRODUCTION OF IRRIGATED BARLEY

9-Hour Day

Yield 2,500 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Establish borders	1M 30T disk ridger	60.0	0.2	0.2
Irrigating	2 M/hrs.		2.0	
Plowing	1M 30T 4-14" plow	12.0	0.8	0.8
Disking (2 times)	1M 30T 20' single disk	45.0	0.4	0.4
Harrowing (2 times)	1M 30T 20' spike harrow	45.0	0.4	0.4
Seeding	2M 30T 2-10' drills	35.0	0.6	0.3
Harvesting	4M 30T 12' combine	25.0	1.6	0.4
Hauling	Contract			
Total hours per acre			6.0	2.5

COST PER ACRE FOR PRODUCTION OF IRRIGATED BARLEY

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	2.5	\$1.00	\$ 2.50
Irrigating	2.0	1.00	2.00
Seeding	0.3	1.00	0.30
Harvesting	1.2	1.00	1.20
Total cost of labor			\$ 6.00
<u>Power Units and Equipment</u>			
Tractor 30 HP track	2.7	2.02	5.45
Disk ridger	0.2	0.08	0.01
Plow 4-14"	0.8	0.27	0.22
Disk 20' single	0.4	0.30	0.12
Harrow 20' spike	0.4	0.04	0.02
Drill 2-10'	0.6	0.31	0.19
Combine 12'	0.4	1.15	0.46
Total cost of power units and equipment			\$ 6.47
<u>Contract and Piece Work</u>			
Hauling from field to warehouse: 2,500 lbs. at \$2 ton			2.50
Storage: 3 months at 75¢ ton first month			
25¢ ton thereafter: 2,500 lbs. at \$1.25 ton			1.56
Total cost of contract and piece work			\$ 4.06
<u>Materials</u>			
Irrigation water: 0.5 acre ft. at \$2			1.00
Seed: 100 lbs. at \$2.27 cwt			2.27
Sacks and twine: 25 at 20¢			5.00
Total cost of materials			\$ 8.27
<u>Miscellaneous</u>			
Taxes			5.00
Management			15.00
Insurance: \$1.50 per \$100 per season insured at \$45 ton			0.85
Interest: 4 per cent of \$250			10.00
Compensation insurance: \$4.20 per \$100 payroll			0.15
Total miscellaneous cost			\$31.00
Total cost per acre \$55.80 - 75¢ credit for pasturage = \$55.05 or \$2.20 per cwt			

BEANS-LARGE LIMAS

Principal Producing Areas

Climatic requirements limit production to a narrow strip running along the coast from Santa Barbara County south. Counties in order of importance are Ventura, Orange, San Diego, Los Angeles, and Santa Barbara.

Environmental Requirements

Climate.—Moderate summer weather with a fair amount of humidity, no sudden changes between day and night temperatures. A frost-free period of about six months is essential. The area of production is characterized by heavy summer fog and cooling ocean breezes. Dry weather at harvest is a necessity.

Soils.—Uniform soils of loam or clay loam texture drained to a depth of six feet or more, and neutral or slightly alkaline in reaction.

Topography.—May be grown on slopes, but the larger part of the crop is irrigated, for which land level enough to handle irrigation water is essential.

Yields Per Acre

	Irrigated	Non-irrigated
Usual	1,500 lbs.	1,000 lbs.
Good	2,000 lbs.	1,500 lbs.
Exceptional	3,000 lbs.	2,000 lbs.

Example of Cost of Producing Large Lima Beans

Based on an irrigated field with a good yield.

INPUTS PER ACRE FOR LIMA BEAN PRODUCTION 9-Hour Day Yield 2,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Disking	1M 30T 10' double disk	30.0	0.3	0.3
Plowing	1M 30T 4-14" plow	9.0	1.0	1.0
Leveling	1M 30T Land plane	25.0	0.4	0.4
Disking (2 times)	1M 30T 10' double disk	30.0	0.7	0.7
Chisel	1M 30T 2-6' chisels			
	15' spike harrow	15.0	0.6	0.6
Harrow (2 times)	1M 30T 2-10' spring tooth harrows	40.0	0.4	0.4
Planting 30" rows	2M 10T 4-row planter	12.0	1.6	0.8
Hoeing (2 times)	2 M/hrs.		4.0	
Irrigating (2 times)	2 M/hrs.		4.0	
Cultivating and furrowing (3 times)	1M 10T 4-row cultivator with furrow shovels	15.0	1.7	1.8
Splitting rows and cutting vines	1M 10T 4-row cutter	30.0	0.3	0.3
Raking	1M 10T side-delivery rake	25.0	0.4	0.4
Threshing	3M 10T 12' combine with pickup attachment	20.0	1.2	0.4
Hauling to warehouse	By the sack			
Recleaning	By the sack			
Total hours per acre			16.7	7.1

COST PER ACRE FOR LIMA BEAN PRODUCTION
Yield 2,000 Pounds

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	7.1	\$1.00	\$ 7.10
Hoeing	4.0	0.85	3.40
Irrigating	4.0	0.90	3.40
Other labor	1.6	1.00	1.60
Total cost of labor			<u>\$15.50</u>
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	3.7	0.72	2.66
Tractor 20 HP track type	3.4	1.48	5.03
Side delivery rake	0.4	0.15	0.06
Bean cutter 4-row	0.3	0.13	0.04
Cultivator 4-row with furrow shovels	1.8	0.18	0.32
Plow 4-14"	1.0	0.27	0.27
Disk - 10' double	1.0	0.27	0.27
Harrow 15' spike	0.6	0.03	0.02
Land plane	0.7	0.76	0.53
Chisel 6'	1.2	0.07	0.08
Planter 4-row	0.8	0.19	0.15
Combine 12' with pickup attachment	0.4	1.15	0.46
Spring tooth harrow 10'	0.8	0.05	0.04
Total cost of power units and equipment			<u>\$ 9.93</u>
<u>Contract and Piece Work</u>			
Hauling to warehouse: 20 sacks at 3¢			0.60
Recleaning: 1 ton at \$3			3.00
Total cost of contract and piece work			<u>\$ 3.60</u>
<u>Materials</u>			
Seed: 80 lbs. at 7-1/2¢			6.00
Irrigation water: 1 acre ft. at \$4			4.00
Sacks and twine: 20 at 20¢			4.00
Total cost of materials			<u>\$14.00</u>
<u>Miscellaneous</u>			
Insurance: \$1.50 per \$100 valuation per yr. (20 cwt. at \$22)			2.75
Storing			2.00
Taxes			8.00
Management			15.00
Interest: 4 per cent of \$800			32.00
Compensation insurance: \$4.20 per \$100 payroll			0.40
Total miscellaneous cost			<u>\$60.15</u>
<u>Total cost per acre \$103.18 - \$5 credit 1 ton straw = \$98.18 or \$4.91 per cwt.</u>			

BEANS--BABY LIMA

Principal Producing Areas

Generally throughout the San Joaquin Valley, in the Sacramento Valley, and in southern California.

Environmental Requirements

Soil.—Rich sandy loam, three feet or more in depth, well drained, free from alkali and injurious salts.

Climate.—Warm to hot weather with a frost-free period of five to six months, and with sunny days and warm nights. Freedom from severe winds is essential. Dry weather to facilitate cutting, curing, and threshing at harvest time is a necessity.

Topography.—May be grown under hilly conditions unless under irrigation when land level enough to drain water is essential.

Yield Per Acre

	Irrigated
Usual	1,200 lbs.
Good	1,800 lbs.
Exceptional	2,500 lbs.

Example of Cost of Producing Baby Lima Beans

INPUTS PER ACRE FOR PRODUCTION OF BABY LIMA BEANS
9-Hour Day Yield 1,800 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 20T 3-14" plow	9.0	1.0	1.0
Disking (2 times)	1M 20T 7' double disk	15.0	1.2	1.2
Harrowing (2 times)	1M 20T 20' spike harrow	60.0	0.3	0.3
Planting 30" row	2M 10T 4-row planter	12.0	1.6	0.8
Hoeing and thinning	6 M/hrs.		6.0	
Hoeing	3 M/hrs.		3.0	
Irrigating (3 times)	4 M/hrs.		12.0	
Cultivating (3 times)	1M 10T 4-row cultivator with furrow shovels	12.0	2.2	2.2
Splitting rows and cutting vines	1M 10T 4-row cutter	18.0	0.5	0.5
Raking	1M 10T side delivery rake	25.0	0.4	0.4
Threshing	3M 20T 12' combine with pickup attachment	25.0	1.2	0.4
Hauling to warehouse	Contract			
Recleaning	Contract			
Total hours per acre			29.4	6.8

COST PER ACRE FOR PRODUCTION OF BABY LIMA BEANS

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	6.8	\$1.00	\$ 6.80
Hoeing	9.0	0.85	7.65
Irrigation	12.0	0.85	10.20
Other labor	1.6	1.00	1.60
Total cost of labor			\$26.25
<u>Power Units and Equipment</u>			
Tractor 10 HP wheel	3.9	0.72	2.81
Tractor 20 HP track	2.9	1.48	4.29
Plow 3-14"	1.0	0.17	0.17
Disk - 7' double	1.2	0.13	0.16
Harrow 20' spike	0.3	0.04	0.01
Planter - 4-row	0.8	0.19	0.15
Combine - 12' with pickup attachment	0.4	1.15	0.46
Cultivator - 4-row with furrow shovels	2.2	0.18	0.40
Bean cutter - 4-row	0.5	0.13	0.06
Side delivery rake	0.4	0.15	0.06
Total cost of power units and equipment			\$ 8.57
<u>Contract and Piece Work</u>			
Hauling to warehouse: 1800 lbs. at \$2 ton			1.80
Recleaning: 1800 lbs. at \$3 ton			2.70
Total cost of contract and piece work			\$ 4.50
<u>Materials</u>			
Seed: 40 lbs. at 14¢			5.60
Irrigation water: 1.3 acre ft. at \$1.50			2.00
Sacks and twine: 18 at 20¢			3.60
Total cost of materials			\$11.20
<u>Miscellaneous</u>			
Storing - 3 months			2.00
Insuring - 3 months \$1.50 per \$100 valuation per yr. (18 cwt. at \$10)			0.90
Taxes			6.00
Management			15.00
Interest: 4 per cent of \$600			24.00
Compensation insurance: \$4.20 per \$100 payroll			0.84
Total miscellaneous cost			\$48.74
Total cost per acre	\$99.26	Cost per cwt.	\$5.51

COST PER ACRE FOR BLACK EYE BEAN PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	6.6	\$1.00	\$ 6.60
Hoeing and thinning	9.0	0.75	6.75
Irrigation	12.0	0.90	10.80
Harvesting	1.4	1.00	1.40
Total cost of labor			<u>\$25.55</u>
<u>Power Units and Equipment</u>			
Tractor 10 HP wheel	3.7	0.72	2.66
Tractor 20 HP track	2.9	1.48	4.29
Plow 3-14"	1.0	0.17	0.17
Disk 7' double	1.2	0.13	0.16
Harrow 20' spike tooth	0.3	0.04	0.01
Planter 4-row	0.6	0.19	0.11
Combine 12' with pickup attachment	0.4	1.15	0.46
Cultivator 4-row with furrow shovels	2.2	0.18	0.40
Bean cutter 4-row	0.5	0.13	0.06
Side delivery rake	0.4	0.15	0.06
Total cost of power units and equipment			<u>\$ 8.38</u>
<u>Contract and Piece Work</u>			
Hauling to warehouse: 1,600 lbs. at \$2 ton			1.60
Recleaning: 1,600 lbs. at \$3 ton			2.40
Fumigating: 1,600 lbs. at \$1.50 ton			1.20
Total cost of contract and piece work			<u>\$ 5.20</u>
<u>Materials</u>			
Sacks: 16 at 20¢			3.20
Seed: 20 lbs. at 30¢			6.00
Irrigation water: 1.3 acre ft. at \$1.50			2.00
Total cost of materials			<u>\$11.20</u>
<u>Miscellaneous</u>			
Storing 3 months			2.00
Insuring 3 months at \$1.50 per \$100 valuation per yr. (16 cwt. at \$22)			1.76
Taxes			6.00
Interest: 4 per cent of \$400			16.00
Management			15.00
Compensation insurance: \$4.20 per \$100 payroll			0.63
Total miscellaneous cost			<u>\$41.39</u>
Total cost per acre	\$91.72	Cost per cwt.	\$5.73

SMALL WHITE BEANS

Principal Producing Areas

Production is centered in the south central coast counties, particularly Monterey County.

Environmental Requirements

Soil.—Rich sandy loam, three feet or more in depth; well drained but not leachy; free from alkali and injurious salts.

Climate.—Warm but not hot days and warm nights, freedom from frost, and a growing season of five to six months. Will stand somewhat high temperatures. Dry weather to facilitate cutting, curing, and threshing at harvest time a necessity.

Topography.—Of importance only on irrigated fields which must be level enough to facilitate use of water.

Yield Per Acre (Recleaned)

	Irrigated	Non-irrigated
Usual	1,500 lbs.	1,000 lbs.
Good	2,200 lbs.	1,500 lbs.
Exceptional	2,500 lbs.	2,000 lbs.

Example of Cost of Producing Small White Beans (Based on good yields under irrigated conditions.)

INPUTS PER ACRE FOR SMALL WHITE BEAN PRODUCTION 9-Hour Day Yield 2,200 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 20T 3-14" plow	9.0	1.0	1.0
Disking (2 times)	1M 20T 7' double disk	15.0	1.2	1.2
Harrowing (2 times)	1M 20T 20' spike harrow	60.0	0.3	0.3
Planting 30' row	2M 20T 4-row planter	12.0	1.6	0.8
Hoeing and thinning	6 M/hrs.		6.0	
Hoeing	3 M/hrs.		3.0	
Furrowing	1M 10T 4-row cultivator with furrow shovels	12.0	0.8	0.8
Irrigating	4 M/hrs.		4.0	
Cultivating (2 times)	1M 10T 4-row cultivator	12.0	1.5	1.5
Sulphuring	1M 10T 4-row duster	20.0	0.4	0.4
Splitting rows and cutting vines	1M 10T 4-row cutter	18.0	0.5	0.5
Raking	1M 10T side delivery rake	25.0	0.4	0.4
Threshing*	3M 20T 12' combine with pickup attachment	25.0	1.2	0.4
Hauling to warehouse	Contract			
Recleaning	Contract			
Total hours per acre			21.9	7.3

*If done by contract figure 35¢ per cwt., field run

COST PER ACRE FOR SMALL WHITE BEAN PRODUCTION
Yield 2,200 Pounds

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	7.3	\$1.00	\$ 7.30
Hoeing	9.0	0.85	7.65
Irrigation	4.0	0.85	3.40
Other labor	2.0	0.85	1.70
Total cost of labor			\$20.05
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	3.6	0.72	2.59
Tractor 20 HP track	3.7	1.48	5.48
Plow 3-14"	1.0	0.17	0.17
Disk 7' double	1.2	0.13	0.16
Harrow 20' spike	0.3	0.04	0.01
Planter 4-row	0.8	0.19	0.15
Combine - 12' with pickup attachment	0.4	1.15	0.46
Cultivator 4-row	2.3	0.18	0.41
Bean cutter 4-row	0.5	0.13	0.06
Side delivery rake	0.4	0.15	0.06
Total cost of power units and equipment			\$ 9.55
<u>Contract and Piece Work</u>			
Hauling to warehouse: 22 cwt. at \$2 ton			2.20
Recleaning: 22 cwt. at \$3 ton			3.30
Total cost of contract and piece work			\$ 5.50
<u>Materials</u>			
Seed: 35 lbs. at 14¢			4.90
Irrigation water: 0.5 acre ft. at \$2.50			1.25
Sulphur: 30 lbs. at 7¢			2.10
Sacks and twine: 22 at 20¢			4.40
Total cost of materials			\$12.65
<u>Miscellaneous</u>			
Storing: 3 months at \$2 ton			2.20
Insuring: 3 months at \$1.50 per \$100 valuation per yr.			0.56
Taxes			12.00
Management			15.00
Interest: 4 per cent of \$800			32.00
Compensation insurance: \$4.20 per \$100 payroll			0.40
Total miscellaneous cost			\$62.16
Total cost per acre	\$109.91	Cost per cwt.	\$5.00

BRUSSELS SPROUTS

Principal Producing Areas

An annual crop produced in connection with various truck crops, usually in rotation. Principal growing areas are in counties: Monterey, Santa Barbara, Santa Clara, Santa Cruz, and San Luis Obispo.

Environmental Requirements

Climate.—Climate is perhaps the principal determinant of suitability of an area for sprouts. This plant requires cool weather, with ample humidity (frequently supplied by fogs); temperate air with no excessive hot spells; continuous favorable growing conditions to prevent forcing of seedstalks. The growing of sprouts is, therefore, largely confined to areas contiguous to the coast. Minimum temperatures should not drop below 40 and maximum above 70 degrees.

Soil.—The better soils for sprouts are light, warm, friable, sandy loams or light loams, 4 feet or more in depth, free from high tables or injurious salts.

Topography.—Topography is important only in so far as it permits economical farming (if the crop be raised without irrigation) or level or gently rolling if to permit preparing for irrigation and subsequent handling of water (if grown under irrigation).

Yield Per Acre

Usual	5,000 lbs.
Good	8,000 lbs.
Exceptional	10,000 lbs.

Example of Cost of Producing Brussels Sprouts

Based on relatively level plantings and good yields. Cost of plants is cost of raising by the farmer and not purchased. Plants set 3 x 3 feet.

INPUTS PER ACRE FOR BRUSSELS SPROUTS PRODUCTION

9-Hour Day

Yield 8,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Disking	1M 20T 8' single disk	18.0	0.5	0.5
Plowing	1M 20T 4-14" plow	9.0	1.0	1.0
Disking	1M 20T 8' single disk	18.0	0.5	0.5
Harrowing	1M 20T 24' spike harrow	45.0	0.2	0.2
Planting	5M 20T 3-row planter	15.0	3.0	0.6
Irrigating (11 times)	9 M/hrs.		99.0	
Cultivating (9 times)	1M 10T 2-row cultivator	12.0	6.8	6.8
Fertilizing	1M 10T 2-row cultivator fertilizer attachment	12.0	0.8	0.8
Dusting (5 times)	1M 10T 2-row duster	15.0	3.0	3.0
Picking	320 M/hrs.		320.0	
Cleaning	180 M/hrs.		180.0	
Packing	10.8 M/hrs.		10.8	
Delivering	By the crate			
Total hours per acre			625.6	13.4



COST PER ACRE FOR BRUSSELS SPROUTS PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Packing	10.8	\$0.85	\$ 9.18
Tractor driver	13.4	1.00	13.40
Cleaning	180.0	0.85	153.00
Planting	2.4	0.85	2.04
Irrigation	99.0	0.85	84.15
Picking	320.0	0.85	272.00
Total cost of labor			\$533.77
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	10.6	0.72	7.63
Tractor 20 HP track type	2.8	1.48	4.14
Disk 8' single	1.0	0.08	0.08
Plow 4-14"	1.0	0.27	0.27
Spike harrow 24'	0.2	0.04	0.01
Planter 3-row	0.6	0.70	0.42
Cultivator 2-row	7.6	0.10	0.76
Fertilizer attachment	0.8	0.08	0.06
Duster 2-row	3.0	0.13	0.39
Total cost of power units and equipment			\$ 13.46
<u>Contract and Piece Work</u>			
Delivering: 120 crates at 9¢			10.80
Total cost of contract and piece work			\$ 10.80
<u>Materials</u>			
Plants: 5,000			10.00
Irrigation water: 2-3/4 acre ft. at \$5			13.75
10-10-5 fertilizer: 1,000 lbs. at \$67 ton			33.50
Dusting powder: 150 lbs. at 15¢			22.50
Crates: 117 at 50¢			53.50
Total cost of materials			\$133.25
<u>Miscellaneous</u>			
Taxes: 1/2 of \$10			5.00
Management: 1/2 of \$24			12.00
Interest: 1/2 of 4 per cent of \$600			12.00
Compensation insurance: \$1.24 per \$100 payroll			6.20
Total miscellaneous cost			\$ 35.20
Total cost per acre	\$726.48	Cost per 75 lb. box	\$6.81

Acknowledgement: Mr. R. H. Woolley, Pescadero

BUSH BERRIES

Blackberries, dewberries, loganberries, youngberries, and raspberries are discussed in this section as typical of bush berries. Currants and gooseberries are omitted because of their relatively unimportant production.

Principal Producing Areas

Statistical data of berry acreages are incomplete. However, principal producing centers are located in the following counties: Santa Cruz, Los Angeles, Tulare, Santa Clara, Orange, and Monterey.

Environmental Requirements

Soil.—The brambles do well on a variety of soils but with preference for sandy loam and loam types, not too high in calcium content and free from alkali or other injurious salts. Soils should be at least three feet in depth, well supplied with organic matter, and not subject to standing water. The raspberries favor the lighter soil types, the blackberries, the heavier, and the loganberries and youngberries, the intermediate types.

Climate.—Most of the brambles prefer warm but not hot sunny days from time of leafing until the end of the harvesting season, or from about the middle of March to October 1—a season of about 6-1/2 months. Cool coastal areas are particularly favorable, with the exception of the youngberry which stands more sunshine and higher temperatures than the other brambles. Generally minimum temperatures during the growing season should not fall much below 40 degrees and maximum above 80 degrees for best results with blacks, dews, logans, and raspberries. A southern exposure is favored as this tends to promote early ripening, when prices are likely to be at somewhat higher levels than when the bulk of the crop comes onto the market. Since berries generally are grown under irrigation, the amount of rainfall is not important. Since these crops ripen during the normally dry season, there is no trouble from rains at picking time.

Topography.—Since the brambles require a constant and uniform moisture supply, most berry plantings are handled under irrigation. The land must, therefore, be level enough to permit proper constructing of irrigating ditches in order to handle water efficiently and economically.

Water Supply.—To insure a supply of irrigation water at all times, berry farms generally rely upon pumping plants located on the properties where the berries are grown.

Yields Per Acre (Plantings in Full Production)

	Usual	Good	Exceptional
Blackberries, boysenberries, loganberries, and youngberries	4,000 lbs.	8,000 lbs.	15,000 lbs.
Red raspberries	4,000 lbs.	6,000 lbs.	10,000 lbs.
Black raspberries	3,000 lbs.	4,500 lbs.	7,500 lbs.

Age to Self-Sustaining Crop.—Blacks and dews	3rd season
Logans and youngs	2nd season
Raspberries	2nd season

Age to Full Production.—Blacks and dews	4th season.
Logans and youngs	3rd season
Raspberries	3rd season

Estimated Productive Life.—Blacks and dews	Until 12 years old
Logans and youngs	Until 7 years old
Raspberries	Until 10 years old

Examples of Cost of Producing Bush Berries

Examples are shown indicative of (a) the groups including Black, Logan, Boysen, and Youngberries and (b) Red Raspberries.

INPUTS PER ACRE FOR BUSH BERRY PRODUCTION

9-Hour Day

Yield 4 Tons

This example is typical of: Black, Logan, Boysen, and Youngberries.

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Prune and wrap	125 M/hrs.		125.0	
Burn brush	15 M/hrs.		15.0	
Dormant spray	2M 15T 300 gal. sprayer	12.0	1.6	0.8
Spread manure	3M 15T trailer	4.0	6.0	2.0
Disk (2 times)	1M 15T 7' double disk	18.0	1.0	1.0
Hoe	3 M/hrs.		3.0	
Furrow	1M 15T 12" plow	9.0	1.0	1.0
Disk (2 times)	1M 15T 7' double disk	18.0	1.0	1.0
Irrigate (10 times)	3 M/hrs.		30.0	
Summer spray (2 times)	2M 15T 300 gal. sprayer	12.0	3.2	1.6
Picking	By crate			
Removing from field (3 truck miles)	1M 1-1/2 tr. (15 hrs. per acre)		15.0	
Crating	18 M/hrs.		18.0	
Hauling to market	By crate			
General truck use (20 miles)				
Total truck miles 23.0	Total hours per acre		218.8	7.4

COST PER ACRE FOR BUSH BERRY PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Crating	18.0	\$0.85	\$ 15.30
Prune, wrap, and burn brush	140.0	0.85	119.00
Tractor and truck driver	22.4	1.00	22.40
Sprayers	2.4	0.85	2.04
Hoeing and hauling manure	6.0	0.85	5.10
Irrigating	30.0	0.85	25.50
Total cost of labor			\$189.34
<u>Power Units and Equipment</u>			
Tractor 15 HP wheel	7.4	0.80	5.92
Truck 1-1/2 ton (23.0 miles at 12.1¢)			2.78
Sprayer - 300 gal.	2.4	0.53	1.27
Trailer	2.0	0.05	0.10
Disk 7' double	2.0	0.13	0.26
Plow 12"	1.0	0.03	0.03
Pruning equipment	50.0	0.01	0.50
Trellises*			32.10
Total cost of power units and equipment			\$ 42.96

*\$112 to establish, 20 yrs. life = Depreciation \$5.60 Repairs \$26.50

COST PER ACRE FOR BUSH BERRY PRODUCTION

CONTINUED

	Cost
<u>Contract and Piece Work</u>	
Picking: 1,000 crates at 25¢	\$250.00
Haul to market: 1,000 crates at 30¢	300.00
Total cost of contract and piece work	\$550.00
<u>Materials</u>	
Spray—Lime sulfur for 200 gal. of 8 per cent spray: 16 gal. at 13¢	2.08
Material for 400 gal. spray:	
Black leaf 40: 1 qt. at \$10 gal.	2.50
Summer oil emulsion: 6 gal. at 50¢	3.00
Baskets—1/2 pint dry: 12,000 at \$3.50 per thousand	42.00
Crates: 1,000 at 10¢	100.00
Manure—delivered: 3 ton at \$10	30.00
Irrigation water: 25 acre ft. at \$8	16.00
Total cost of materials	\$195.58
<u>Miscellaneous</u>	
Taxes	7.00
Management	42.00
Depreciation of vines—\$200 to establish, 10 yrs. productive life	20.00
Interest on investment: 4 per cent of \$600	24.00
Compensation insurance: \$1.24 per \$100 payroll	1.24
Total miscellaneous cost	\$ 94.24
Total cost per acre \$1,072.12	Cost per 8 lb. crate \$1.07

INPUTS PER ACRE FOR RED RASPBERRY PRODUCTION

9-Hour Day

Yield 6,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Prune, tie, and train	20 M/hrs.		20.0	
Brush disposal	10 M/hrs.		10.0	
Disk	1M 10T 5' double disk	10.0	0.9	0.9
Plow and furrow (2 times)	1M 10T 12" plow	4.5	4.0	4.0
Fertilizing by hand (2 truck miles)	1M 1-1/2 Tr.	1.0	1.0	
Irrigate (12 times)	2 M/hrs.		24.0	
Hoeing	20 M/hrs.		20.0	
Prune and sucker between crops	40 M/hrs.		40.0	
Hoeing	15 M/hrs.		15.0	
Picking	By crate			
Hauling (10 truck mi.)	1M 1-1/2 truck	0.9	10.0	
Packing	By crate			
General Tr. use (10 mi.)				
Total truck miles 22.0	Total hours per acre		144.9	4.9

COST PER ACRE FOR RED RASPBERRY PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
General labor	1.0	\$0.85	\$ 0.85
Pruning, tying, training, suckering	60.0	0.85	51.00
Brush disposal	10.0	0.85	8.50
Tractor and truck driver	14.9	1.00	14.90
Irrigating	24.0	0.85	20.40
Hoeing	35.0	0.85	29.75
Total cost of labor			\$125.40
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	4.9	0.72	3.53
Truck 1-1/2 ton (22.0 miles at 12.1¢)			2.66
Disk 5' double	0.9	0.17	0.15
Plow 12"	4.0	0.03	0.12
Trellises cost \$85 Depreciation \$21.25			
Interest 1.70			22.95
Temporary housing			40.00
Irrigating pump	48.0	0.50	24.00
Total cost of power units and equipment			\$ 93.41
<u>Contract and Piece Work</u>			
Picking—crates of twelve 8 oz. baskets or 6 lbs.			
1,000 crates at 18¢			180.00
Packing: 1,000 crates at 12¢			120.00
Total cost of contract and piece work			\$300.00
<u>Materials</u>			
Fertilizer 6-9-6: 800 lbs. at \$50 ton			20.00
Crates and baskets: 1,000 at 12¢			120.00
Total cost of materials			\$140.00
<u>Miscellaneous</u>			
Taxes			7.00
Management			42.00
Depreciation of vines: \$200 to establish, 4 yrs. productive life			50.00
Compensation insurance: \$1.24 per \$100 payroll			1.20
Interest on investment: 4 per cent of \$600			24.00
Total miscellaneous cost			\$124.20
Total cost per acre \$783.01	Cost per 6 lb. crate (net) \$1.30		

Acknowledgement: E. H. Haack, Manager of the Central California Berry Growers Association, San Francisco for the information on Red Raspberries

CABBAGE

Principal Producing Areas

Counties of major production in order of importance are: Los Angeles, Imperial, San Mateo, and Orange.

Environmental Requirements

Soil.—Heavy clay loams, retentive of moisture but well drained, at least three feet in depth. Although plants will tolerate some white alkali, best results are obtained from soils free of injurious salts.

Climate.—These plants favor cool weather conditions during the 4-5 months of growing season. Temperate air, with relatively high humidity and no excessive heat is essential. Freedom from sudden changes in temperatures is important to guard against formation of seed stalks. Light frosts after the plants are well established are not particularly detrimental. Minima temperatures are best which do not drop much below 40 degrees, and maxima those which do not rise much above 70 degrees.

When grown under nonirrigated conditions from 12 to 18 inches of rainfall available to these crops is necessary.

Topography.—When grown under nonirrigated conditions rolling topography is satisfactory, provided the terrain is not so steep that cultural operations become unduly costly. Under irrigated conditions the land must lie so that provision for and handling of irrigation water is both efficient and economical.

Yield Per Acre

Usual	10 tons	200 crates	(Crates are 13" x 18" x 21-5/8" [inside
Good	15	300	dimensions], hold 35 head, weigh 98-118
Exceptional	20	400	lbs. gross; 90-110 lbs. net.)

Example of Cost of Producing Cabbage
(Based on a yield of 15 tons of market cabbage.)

INPUTS PER ACRE FOR CABBAGE PRODUCTION
9-Hour Day Yield 15 Tons 300 Crates

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 20T 3-14" plow	9.0	1.0	1.0
Disking (2 times)	1M 20T 8' double disk	20.0	0.9	0.9
Harrowing (2 times)	1M 20T 10' spring tooth	22.0	0.8	0.8
Cold frame labor	10 M/hrs.		10.0	
Pulling plants	6,000 at 7 M/hrs.		7.0	
Transplanting	3M 10T 2-row transplanter	10.0	2.7	0.9
Irrigating (5 times)	2 M/hrs.		10.0	
Cultivating (3 times)	1M 10T 2-row cultivator	13.0	2.1	2.1
Applying fertilizer	1M 10T 2-row cultivator fertilizer attachment	13.0	0.7	0.7
Hoeing	5 M/hrs.		5.0	
Dusting (2 times)	1M 10T 4-row duster	60.0	0.3	0.3
Cutting	45 M/hrs.		45.0	
Hauling to packing shed (12 truck mi.)	2M 1-1/2 Tr.	1.0	18.0	
Trimming, packing, loading	By the crate			
Hauling to market	By the crate			
Total truck miles 12.0	Total hours per acre	103.5	6.7	

COST PER ACRE FOR CABBAGE PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
General labor	10.8	\$0.75	\$ 8.10
Tractor and truck driver	15.7	1.00	15.70
Irrigating	10.0	0.75	7.50
Hoeing	5.0	0.75	3.75
Cold frame labor and pulling plants	17.0	0.75	12.75
Harvesting	45.0	0.75	33.75
Total cost of labor			\$ 81.55
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	4.0	0.72	2.88
Tractor 20 HP track	2.7	1.48	4.00
Truck (12.0 miles at 12.1¢)			1.45
Spring tooth harrow 10'	0.8	0.05	0.04
Duster 4-row	0.3	0.20	0.06
Transplanter 2-row	0.9	0.18	0.16
Fertilizer attachment	0.7	0.08	0.06
Cultivator 2-row	2.8	0.10	0.28
Disk 8' double	0.9	0.15	0.14
Cold frame 166 sq. ft. \$25 for 5 yrs.			
Depreciation \$4.20			
Interest 0.42			4.62
Plow 3-14"	1.0	0.17	0.17
Total cost of power units and equipment			\$ 13.86
<u>Contract and Piece Work</u>			
Trimming, packing and loading: 300 crates at 28¢			84.00
Hauling to market: 300 crates at 6¢			18.00
Total cost of contract and piece work			\$102.00
<u>Materials</u>			
Manure: 10 tons at \$5			50.00
Irrigation water: 1-1/4 acre ft. at \$4			5.00
Nicotine dust: 50 lbs. at 25¢			12.50
Calcium arsenate: 50 lbs. at 10¢			5.00
Ammonium sulphate: 400 lbs. at \$53 ton			10.60
Seed: 3 lbs. at \$1			3.00
Crates: 300 at 30¢			90.00
Total cost of materials			\$176.10
<u>Miscellaneous</u> (Land double cropped so charge half to each crop)			
Taxes: 1/2 of \$10			5.00
Management: 1/2 of \$24			12.00
Interest: 1/2 of 4 per cent of \$600			12.00
Compensation insurance: \$1.24 per \$100 payroll			1.50
Total miscellaneous cost			\$ 30.50
Total cost per acre \$404.01	Cost per 100 lb. crate \$1.35		

CANTALOUPE

Principal Producing Areas

Counties growing 1,000 acres or more (in order of importance) are: Fresno, Imperial, Merced, Riverside, Stanislaus, Kern and Tulare.

Environmental Requirements

Soil.—Light, warm, friable, fertile fine sandy loam, sandy loam, or light loam soil, at least four feet deep; retentive of moisture but well drained; well supplied with organic matter; free from alkali or other injurious salts.

Climate.—Warm to hot sunny days and warm nights, freedom from frost, cold winds, and high humidity at all times during the growing season of 5 to 6 months. Low atmospheric humidity during the ripening period. Minima temperatures of 60 and maxima of 100 degrees are desirable limits.

Topography.—Since customarily grown under irrigated conditions, the terrain must lend itself to proper construction of irrigating facilities and subsequent economical handling of irrigating streams.

Yields Per Acre

Usual	6.5 tons	200 standard 65-lb. crates
Good	10	300
Exceptional	14	450

Weights Per Melon.—1.5 to 3.0 lbs. Average 2 lbs.

Example of Cost of Producing Cantaloupes

(Based on Central Valley conditions and a yield of 10 tons.)

INPUTS PER ACRE FOR CANTALOUPE PRODUCTION*
9-Hour Day Yield 10 Tons, 300 Crates

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Furrow	1M 10T 4-shovel furrower	20.0	0.4	0.4
Irrigate	3 M/hrs.		3.0	
Spring tooth	1M 10T 10' springtooth	25.0	0.4	0.4
Ridge	1M 10T 2-14" plow	5.0	1.8	1.8
Plant 7' rows	1M 10T 2-row seeder	20.0	0.4	0.4
Cultivating (2 times)	1M 10T 6' harrow	12.0	0.8	0.8
Hoeing, thinning, replanting skips	10 M/hrs.		10.0	
Furrowing (2 times)	1M 10T 4" shovel furrower	20.0	0.8	0.8
Irrigating (5 times)	3M/hrs.		15.0	
Dusting	1M 10T 2-row duster	30.0	0.3	0.3
Distributing crates	2M 10T trailer	20.0	0.8	0.4
Picking	By the crate			
Hauling to packing shed	By the crate			
Sorting and packing	By the crate			
Total hours per acre			33.7	5.3

*Other than Imperial Valley

COST PER ACRE FOR CANTALOUPE PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	5.3	\$1.00	\$ 5.30
Hoeing	10.0	0.75	7.50
Irrigating	18.0	0.75	13.50
General labor	0.4	0.75	0.30
Total cost of labor			\$ 26.60
<u>Power Units and Equipment</u>			
10 HP wheeled	5.3	0.72	3.82
Plow 2-14"	1.8	0.15	0.27
Seeder 2-row	0.4	0.11	0.04
Harrow spike 6'	0.8	0.01	0.01
Furrower 4-shovel	1.2	0.08	0.10
Spring tooth 10'	0.4	0.05	0.02
Duster 2-row	0.3	0.13	0.03
Trailer	0.4	0.05	0.02
Total cost of power units and equipment			\$ 4.31
<u>Contract and Piece Work</u>			
Picking: 300 crates at 23¢			69.00
Hauling to packing shed: 300 crates at 15¢			45.00
Sorting and packing: 300 crates at \$1.47			441.00
Total cost of contract and piece work			\$555.00
<u>Materials</u>			
Irrigation water: 3 acre ft. at \$4			12.00
Nicotine dust: 20 lbs. at 25¢			5.00
Seed: 2 lbs. at 75¢			1.50
Total cost of materials			\$ 18.50
<u>Miscellaneous</u>			
Taxes			8.00
Management			24.00
Interest: 4 per cent on \$600			24.00
Compensation insurance: \$1.24 per \$100 payroll			0.70
Total miscellaneous cost			\$ 56.70
Total cost per acre	\$661.11	Cost per 65 lb. crate	\$2.20

CARROTS

Principal Producing Areas

Carrots are produced for marketing during various times of the year, depending upon local climatic conditions and operators' ideas as to when is the best time to place this crop on the market. Carrots are commonly classified as fall, winter, or spring carrots, the season designating the time of harvesting and marketing—not planting.

Counties of major acreage in order of importance are:

Spring carrots.—Monterey, Fresno, Los Angeles, Ventura

Fall carrots.—Monterey, Santa Barbara, Fresno, Los Angeles

Winter carrots.—Imperial, Riverside

Environmental Requirements

Soil.—Deep, fertile, well drained fine sandy loam or light loam; at least four feet in depth; well supplied with organic matter; free from alkali or other injurious salts; free from serious weeds.

Climate.—A cool-weather plant, hence does its best under conditions of a moderately cool climate; not hurt by occasional light frosts; favors a fair amount of atmospheric humidity; preferable minima are 40 degrees and maxima of 70. Dryness at harvest time is essential; usually grown under irrigated conditions so annual rainfall not a primary factor, except as it affects the quantity and quality of the irrigating supply.

Topography.—Land sufficiently level so that irrigation can be economically and satisfactorily carried on.

Yield Per Acre

(Crates of 6 dozen bunches; 85 lbs. net)

Usual	200
Good	330
Exceptional	500

Example of Cost of Producing Fall Carrots

Carrots are planted throughout most of the year in the productive areas except during the extreme summer heat of the Imperial Valley. Therefore, practices will vary depending on whether the growing season is in the summer or winter. This example is for carrots harvested during the fall with the growing season during the summer and fall, thus requiring more irrigation than crops harvested in the spring or early summer.

INPUTS PER ACRE FOR FALL CARROT PRODUCTION

9-Hour Day		Yield 330 Crates		
Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 20T 3-14" plow	9.0	1.0	1.0
Disk and harrow	1M 20T 10' double disk-			
(2 times)	10' spike harrow	27.0	0.7	0.7
Fertilize	2M 10T broadcaster	40.0	0.4	0.2
Bedding	1M 20T 3-row lister	27.0	0.3	0.3
Irrigation	3 M/hrs.		3.0	
Planting	1M 10T 2 double row			
	planting and shaping			
	sleds	15.0	0.6	0.6
Spraying weeds	1M 10T sprayer 30' boom	80.0	1.1	1.1
Irrigating (6 times)	3 M/hrs.		18.0	
Cultivate and fertilize	1M 10T 4-row cultivator			
	fertilizer attachment	12.0	0.8	0.8
Cultivate (3 times)	1M 10T 4-row cultivator	15.0	1.8	1.8
Plowing out	1M 20T carrot lifter	8.0	1.1	1.1
Pulling, bunching, tying	By the crate			
Hauling to packing				
shed (50 truck mi.)	2M 1-1/2 tr.	2.0	9.0	
Total truck miles 50.0	Total hours per acre		37.8	7.6

COST PER ACRE FOR FALL CARROT PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor and truck driver	12.1	\$1.00	\$ 12.10
Irrigating	21.0	0.75	15.75
Other labor	4.7	0.75	3.52
Total cost of labor			\$ 31.37
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	4.3	0.72	3.10
Tractor 20 HP track	3.3	1.48	4.88
Truck (50.0 miles at 12.1¢)			6.05
Carrot lifter	1.1	0.07	0.08
Plow 3-14"	1.0	0.17	0.17
Disk 10' double	0.7	0.27	0.19
Harrow 10' spike	0.7	0.02	0.01
Broadcaster	0.2	0.05	0.01
Lister 3-row	0.3	0.39	0.12
Planting shed—2-row	1.2	0.08	0.10
Sprayer—weed	1.1	0.12	0.13
Cultivator 4-row	2.6	0.18	0.47
Fertilizer attachment	0.8	0.08	0.06
Total cost of power units and equipment			\$ 15.37
<u>Contract and Piece Work</u>			
Pulling, bunching, tying: 330 crates at 42¢			138.60
Packing house charge: 330 crates at \$2.37			782.10
Total cost of contract and piece work			\$920.70
<u>Materials</u>			
Seed: 2 lbs. at \$1.50			3.00
Oil spray for weeds: 60 gal. at 10¢			6.00
Ammonium sulphate fertilizer: 250 lbs. at \$53 ton			6.90
Nitrate of soda: 300 lbs. at \$50 ton			7.50
Irrigation water: 1.5 acre ft. at \$3			4.50
Total cost of materials			\$ 27.90
<u>Miscellaneous</u> (Double cropped so charge half to this crop)			
Taxes: 1/2 of \$10			5.00
Management: 1/2 of \$24			12.00
Interest: 1/2 of 4 per cent of \$600			12.00
Compensation insurance: \$1.24 per \$100 payroll			0.25
Total miscellaneous cost			\$ 29.25
Total cost per acre \$1,024.59	Cost per crate \$3.10		

CAULIFLOWER

Principal Producing Areas

Counties of major acreages in order of importance are:

Winter cauliflower.—Los Angeles, Santa Barbara, AlamedaSpring cauliflower.—Santa Barbara, Alameda, San Luis Obispo, Los Angeles

Environmental Requirements

Soil.—Heavy clay loams, retentive of moisture but well drained, at least three feet in depth. Although plants will tolerate some white alkali, best results are obtained from soils free of injurious salts.

Climate.—These plants favor cool weather conditions during the 4-5 months of growing season. Temperate air, with relatively high humidity and no excessive heat is essential. Freedom from sudden changes in temperatures is important to guard against formation of seed stalks. Light frosts after the plants are well established are not particularly detrimental. Minima temperatures are best which do not drop much below 40 degrees, and maxima those which do not rise much above 70 degrees.

When grown under nonirrigated conditions from 12 to 18 inches of rainfall available to these crops is necessary.

Topography.—When grown under nonirrigated conditions rolling topography is satisfactory, provided the terrain is not so steep that cultural operations become unduly costly. Under irrigated conditions the land must lie so that provision for and handling of irrigation water is both efficient and economical.

Yields Per Acre

Usual	5 tons	250 crates	(Crates are 8-1/2" x 18" x 21-5/8"
Good	8	400	[inside dimensions], hold 9-15 head,
Exceptional	12	600	weigh about 42 lbs. gross; 40 lbs. net.)

Example of Cost of Producing Cauliflower

INPUTS PER ACRE FOR CAULIFLOWER PRODUCTION 9-Hour Day Yield 8 Tons, 400 Crates

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 20T 3-14" plow	9.0	1.0	1.0
Disking (2 times)	1M 20T 8' double disk	20.0	0.9	0.9
Harrowing (2 times)	1M 20T 10' springtooth	22.0	0.8	0.8
Furrowing	1M 20T 2-row lister	15.0	0.6	0.6
Growing plants in open beds (6,000 plants)	6 M/hrs.		6.0	
Transplanting	3M 10T 2-row trans- planter	13.0	2.1	0.7
Irrigating (5 times)	2 M/hrs.		10.0	
Cultivating (3 times)	1M 10T 2-row cultivator	13.0	2.1	2.1
Applying fertilizer	1M 10T 2-row cultivator fertilizer attachment	5.0	0.7	0.7
Hoeing	5 M/hrs.		5.0	
Dusting (2 times)	1M 10T 4-row duster	60.0	0.3	0.3
Cutting and loading	30 M/hrs.		30.0	
Hauling to packing shed (25 tr. mi.)	1M 1-1/2 tr.	1.0	9.0	
Packing	25 M/hrs.		25.0	
Hauling to market (50 truck mi.)	2M 1-1/2 tr.	2.0	9.0	
Total truck miles 75.0		Total hours per acre	102.5	7.1

COST PER ACRE FOR CAULIFLOWER PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
General labor	5.9	\$0.75	\$ 4.42
Tractor and truck driver	20.6	1.00	20.60
Irrigating	10.0	0.75	7.50
Hoeing	5.0	0.75	3.75
Plant bed labor	6.0	0.75	4.50
Harvesting and packing	55.0	0.65	35.75
Total cost of labor			\$ 76.52
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	3.8	0.72	2.74
Tractor 20 HP track	3.3	1.48	4.88
Truck (75.0 miles at 12.1¢)			9.08
Spring tooth harrow 10'	0.8	0.05	0.04
Disk 8' double	0.9	0.15	0.14
Transplanter 2-row	0.7	0.18	0.13
Lister 2-row	0.6	0.29	0.17
Cultivator 2-row	2.8	0.10	0.28
Fertilizer attachment	0.7	0.08	0.06
Duster 4-row	0.3	0.20	0.06
Plow 3-14"	1.0	0.17	0.17
Total cost of power units and equipment			\$ 17.75
<u>Materials</u>			
Seed: 5 lbs. at \$1			5.00
Irrigation water: 1-1/4 acre ft. at \$4			5.00
Nicotine dust: 50 lbs. at 25¢			12.50
Calcium arsenate: 50 lbs. at 10¢			5.00
Ammonium sulphate fertilizer: 400 lbs. at \$53 ton			10.60
Crates: 400 at 47¢			188.00
Total cost of materials			\$226.10
<u>Miscellaneous</u> (Land double cropped so charge half to each crop)			
Taxes: 1/2 of \$24			12.00
Management: 1/2 of \$24			12.00
Interest: 1/2 of 4 per cent of \$600			12.00
Compensation insurance: (only on this crop) \$1.24 per \$100 payroll			0.62
Total miscellaneous cost			\$ 36.62
Total cost per acre	\$356.99	Cost per crate	89¢

CELERY

Principal Producing Areas

Of the counties producing fall celery, San Joaquin is the most important, with lesser acreages in Monterey, Santa Barbara, Santa Clara, and Los Angeles.

Counties producing winter celery in order of importance are San Diego, Orange, and Tulare.

Spring celery is produced in Los Angeles, Orange, and Ventura counties.

Environmental Requirements

Soil.—Light, well-drained, but with abundant moisture. Celery will grow on all soils except the heavier clays, but the principal acreage is on the peatlands of the Delta section.

Climate.—Relatively cool growing season with cool nights and days of bright sunshine.

Topography.—Must be level because irrigation is necessary.

Yield Per Acre

Usual	20,000 lbs.
Good	30,000 lbs.
Exceptional	40,000 lbs.

Example of Cost of Producing Celery (Based on Delta conditions.)

INPUTS PER ACRE FOR CELERY PRODUCTION UNDER DELTA CONDITIONS 9-Hour Day Yield 30,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plow	1M 20T 4-24" disk plow	15.0	0.6	0.6
Plane	1M 20T land plane	30.0	0.3	0.3
Check	1M 20T V ridger	40.0	0.2	0.2
Flood	2 M/hrs.		2.0	
Plant	10M 20T 3-row planter	9.0	10.0	1.0
Irrigate	1M	9.0	1.0	
Crowd (3 times)	4M 20T 3-hand cultivators	12.0	9.0	2.2
Scratch (3 times)	5 M/hrs.		15.0	
Cultivate (3 times)	1M 10T 4-row cultivator	15.0	1.8	1.8
Fertilize	1M 10T 4-row cultivator fertilizer attachment	15.0	0.6	0.6
Banking	4M 20T 3-hand bankers	15.0	2.4	0.6
Cutting	1M 10T 2-row celery cutter	10.0	0.9	0.9
Pull and trim	By the crate			
Haul to packing shed (20 truck mi.)	2M 1-1/2 tr.	2.0	9.0	
Packing	80 M/hrs.		80.0	
Bed labor for producing plants	Plowing, disking, harrowing, planting, irrigating, weeding		0.8	0.4
Pulling plants	52,270 at 50 M/hrs.		50.0	
Total truck miles	20.0	Total hours per acre	183.6	8.6

COST PER ACRE FOR CELERY PRODUCTION

Labor	Hours	Rate per hour	Cost
General labor	4.9	\$0.75	\$ 3.68
Tractor and truck driver	13.1	1.00	13.10
Irrigating	3.0	0.75	2.25
Pulling plants and planting	59.0	0.75	44.25

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COST PER ACRE FOR CELERY PRODUCTION

CONTINUED

	Hours	Rate per hour	Cost
<u>Labor (Cont.)</u>			
Cultivators and scratchers	23.6	\$0.75	\$ 17.70
Packing	80.0	1.00	80.00
Total cost of labor			<u>\$160.98</u>
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	3.7	0.72	2.66
Tractor 20 HP track	4.9	1.48	7.25
Truck (20.0 miles at 12.1¢)			2.42
Pumping plant including power			4.00
Plow 4-24" disk	0.6	0.28	0.17
Land plane	0.3	0.76	0.23
V ridger	0.2	0.15	0.03
Planter 3-row	1.0	0.70	0.70
Hand cultivators and bankers	8.4	0.01	0.08
Cultivator 4-row	1.8	0.18	0.32
Fertilizer attachment	0.6	0.08	0.05
Celery cutter	0.9	0.10	0.09
Packing shed and equipment			1.20
Total cost of power units and equipment			<u>\$ 19.20</u>
<u>Contract and Piece Work</u>			
Pull and trim (70 lb. crates): 430 at 30¢			\$129.00
<u>Materials</u>			
Fertilizer 8-10-12: 400 lbs. at \$60 ton			12.00
Crates: 430 at 35¢			150.50
Total cost of materials			<u>\$162.50</u>
<u>Miscellaneous</u>			
Taxes: 1/2 of \$10			5.00
Management: 1/2 of \$24			12.00
Interest: 1/2 of 4 per cent of \$800			16.00
Compensation insurance: \$1.24 per \$100 payroll			2.48
Total miscellaneous cost			<u>\$ 35.48</u>
Total cost per acre	\$507.16	Cost per 70 lb. crate	\$1.18

CHERRIES

Principal Producing Areas

Of about 3,000 acres of the Royal Ann variety of cherries, the principal producing counties (in order of importance) are: San Joaquin, Santa Clara, Sonoma, and Alameda. Of about 6,300 acres of bearing cherry orchards of varieties other than Royal Ann the principal plantings are in the counties of San Joaquin, Santa Clara, and Riverside.

Environmental Requirements

Soil.—Light, moist, well-drained loams (alluvial sedimentary soils being exceptionally good). Some variation in choice of soils is possible by use of different rootstocks. Depth should be 10 feet or more with no clay or gravel streaks; freedom from injurious salts is essential.

Climate.—Mild year-round climatic conditions; freedom from frost during the growing season (middle of March to October; freedom from excessive

temperatures and low humidity; freedom from rains during blossoming and ripening times. Minima and maxima limitations are about 50 and 70 degrees respectively during the growing season. If grown under nonirrigated conditions, an annual rainfall of at least 24 inches is essential. If grown under irrigation, rainfall not an important factor except as it affects the quantity and quality of the irrigation supply.

Topography.—If grown under nonirrigated conditions rolling terrains are satisfactory provided they are not so steep that cultivation is interfered with or rendered unduly expensive. Southern exposures promote early ripening and the early market commands better prices.

If irrigated, the land should be level enough to permit construction of irrigation facilities and economical handling of the irrigation water.

Yield Per Acre (Mature Orchards)

Usual	1.5 tons	Age to self sustaining crop 7-8 years.
Good	3.0 tons	Age to full production 10-12 years.
Exceptional	5.0 tons	Estimated productive life until 50-60 years.

Example of Cost of Producing Cherries

Based on a mature orchard of 50 trees per acre on level, irrigated land. Examples are shown utilizing the fruit for (1) canning, and (2) fresh fruit.

Spray Program.—Three applications of 5 per cent lime sulphur with 4 pounds of wettable sulphur per 100 gallons at 400 gallons per acre starting when the fruit starts to color and ending about a week before harvest for control of Brown Rot and Cherry slug.

Bordeaux 8-8-50 applied to trunk and framework branches at 150 gallons per acre in the late fall or early winter for control of Bacterial Gummosis.

INPUTS PER ACRE FOR CANNING CHERRY PRODUCTION 9-Hour Day Yield 6,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Fall spray	3M 20T 400 gal. sprayer	20.0	0.6	0.2
Plant cover crop	2M 20T broadcaster	40.0	0.4	0.2
Harrow (2 times)	1M 20T 18' spike harrow	40.0	0.4	0.4
Pruning	9 M/hrs.		9.0	
Removing brush	2M 20T sled	5.0	3.6	1.8
Spraying (3 times)	3M 20T 400 gal. sprayer	10.0	8.1	2.7
Fertilizing	2M 20T broadcaster	40.0	0.4	0.2
Disk (5 times)	1M 20T 8' double disk	20.0	2.2	2.2
Checking (2 times)	1M 20T disk ridger	10.0	1.8	1.8
Irrigation (3 times)	6 M/hrs.		18.0	
Distributing picking equipment	2M 20T trailer	6.0	0.6	0.3
Picking	10 M/days		90.0	
Hauling to cannery (40 truck miles)	1M 1-1/2 Tr.	3.0	3.0	
Total truck miles 40.0			Total hours per acre 139.6	9.8

COST PER ACRE FOR CANNING CHERRY PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
General labor	2.5	\$0.85	\$ 2.12
Tractor and truck driver	14.3	1.00	14.30
Pruning	9.0	0.85	7.65
Irrigating	18.0	0.85	15.30
Spraying	5.8	0.85	4.94
Picking	90.0	0.85	76.50
Total cost of labor			\$120.81
<u>Power Units and Equipment</u>			
Tractor 20 HP track type	9.8	1.48	14.50
Truck (40.0 miles at 12.1¢)			4.84
Sprayer 400 gal.	2.9	0.83	2.41
Disk 8' double	2.2	0.15	0.33
Broadcaster	0.4	0.05	0.02
Harrow 18' spike	0.4	0.04	0.02
Disk ridger	1.8	0.08	0.14
Trailer or sled	2.1	0.05	0.11
Picking equipment			0.21
Pruning equipment	9.0	0.01	0.09
Lug boxes: 50 at 3¢			1.50
Total cost of power units and equipment			\$ 24.17
<u>Materials</u>			
Ammonium sulphate fertilizer: 500 lbs. at \$53 ton			13.25
Melilotus indica seed: 25 lbs. at 12¢			3.00
Irrigation water: 1.5 acre ft. at \$6			9.00
Material for 150 gallons 8-8-50 Bordeaux			
Bluestone: 24 lbs. at 7-1/2¢			1.80
Lime: 24 lbs. at 1-1/2¢			0.36
Material for 1200 gallons 0.5 per cent lime sulphur (with 4 lbs. wettable sulphur per 100 gallons)			
Lime sulphur: 6 gals. at 13¢			0.78
Wettable sulphur: 48 lbs. at 11¢			5.28
Total cost of materials			\$ 33.55
<u>Miscellaneous</u>			
Taxes			10.00
Depreciation of trees: \$300 to establish, 40 yrs. productive life			7.50
Management charge			30.00
Interest: 4 per cent of \$1,000			40.00
Compensation insurance: \$2.45 per \$100 payroll			2.45
Total miscellaneous cost			\$ 89.95
Total cost per acre	\$268.48	Cost per pound	4.5¢

INPUTS PER ACRE FOR FRESH CHERRY PRODUCTION
9-Hour Day Yield 6,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Fall spray	3M 20T 400 gal. sprayer	20.0	0.6	0.2
Planting cover crop	2M 20T broadcaster	40.0	0.4	0.2
Harrow (2 times)	1M 20T 18' spike harrow	40.0	0.4	0.4
Pruning	9M/hrs.		9.0	
Removing brush	2M 20T sled	5.0	3.6	1.8
Fertilizing	2M 20T broadcaster	40.0	0.4	0.2
Spraying (3 times)	3M 20T 400 gal. sprayer	10.0	8.1	2.7
Cultivating (5 times)	1M 20T 8' double disk	20.0	2.2	2.2
Checking (2 times)	1M 20T disk ridger	10.0	1.8	1.8
Irrigation (3 times)	6 M/hrs.		18.0	
Distributing picking equipment	2M 20T trailer	6.0	0.6	0.3
Picking	12.2 M/days		110.0	
Hauling to packing shed (3 truck mi.)	1M 1-1/2 tr.	3.0	3.0	
Packing	150 M/hrs.		150.0	
Total truck miles 3.0	Total hours per acre		308.1	9.8

COST PER ACRE FOR FRESH CHERRY PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
General labor	2.5	\$0.85	\$ 2.12
Tractor and truck driver	12.8	1.00	12.80
Pruning	9.0	0.85	7.65
Irrigating	18.0	0.85	15.30
Spraying	5.7	0.85	4.85
Picking	110.0	0.85	93.50
Packing	150.0	0.85	127.50
Total cost of labor			\$263.72
<u>Power Units and Equipment</u>			
Tractor 20 HP track	9.8	1.48	14.50
Truck (3.0 miles at 12.1¢)			0.36
Pruning equipment	9.0	0.01	0.09
Sprayer 400 gallon	2.9	0.83	2.41
Disk 8' double	2.2	0.15	0.33
Broadcaster	0.4	0.05	0.02
Harrow 18' spike	0.4	0.04	0.02
Disk ridger	1.8	0.08	0.14
Trailer or sled	2.1	0.05	0.11
Picking equipment			0.21
Lug boxes: 50 at 3¢			1.50
Packing house			40.00
Total cost of power units and equipment			\$ 59.69

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COST PER ACRE FOR FRESH CHERRY PRODUCTION

CONTINUED

	Cost
<u>Materials</u>	
Lug boxes: 400 at 30¢	\$120.00
Ammonium sulphate fertilizer: 500 lbs. at \$53 ton	13.25
Melilotus indica seed: 25 lbs. at 12¢	3.00
Irrigation water: 1.5 acre ft. at \$6	9.00
Bordeaux 8-8-50: 150 gal. at \$1.44 per 100	2.16
Lime sulphur 0.5 per cent plus 4 lbs. wettable sulphur:	
1200 gal. at 50-1/2¢ per 100	6.06
Total cost of materials	\$153.47
<u>Miscellaneous</u>	
Taxes	10.00
Depreciation of trees: \$300 to establish, 40 yrs. productive life	7.50
Management	30.00
Interest: 4 per cent of \$1,000	40.00
Compensation insurance: \$2.45 per \$100 payroll	2.45
Total miscellaneous cost	\$ 89.95
Total cost per acre \$566.83	Cost per 15 lb. box \$1.42

COTTON

Principal Producing Areas

Conditions favorable for cotton production in California are found in the San Joaquin Valley and in the reclaimed desert areas of Coachella, Palo Verde, Imperial and Bard valleys. The present principal producing areas by counties, and in order of importance, are: Fresno, Tulare, Kern, Kings and Madera.

Environmental Requirements

Soil.—Best results obtained from cotton are from soils of a silt loam or fine sandy loam texture; four feet or more in depth; free from alkali or other injurious salts; friable; fertile; easily tilled; retentive of moisture.

Climate.—Favorable climatic conditions comprise weather that is warm and mild during the planting and growing season; free from extremes between day and night temperatures; hot summers; freedom from unseasonable rains during the ripening and picking season; and a frost-free period of from 7 to 9 months with minimum temperatures unlikely to drop much below 60 degrees for any period of time.

Topography.—Level land permitting proper handling of irrigation water is essential since the crop is invariably grown under irrigation.

Moisture requirements total from 30 to 36 acre-inches of water available as needed (from rainfall or irrigating supplies) throughout the entire growing and maturing period.

Governmental Restrictions

Only the Acala variety of medium long staple cotton may legally be grown in California.

Under the Agricultural Adjustment Administration cotton can qualify for government payments only if the farm where cotton is produced has a record of past cotton production within a fixed period. Since the rules and regulations

tend to be changed annually, up-to-date information should be sought from officials connected with or familiar with the cotton program, because each cotton grower must stay within his allotted acreage, and in addition conform to other cropping requirements, especially if he seeks government loans on cotton and benefit payments.

Yields Per Acre

	Lint	Cottonseed
Usual	400 lbs.	680 lbs.
Good	750 lbs.	1,275 lbs.
Exceptional	1,200 lbs.	2,080 lbs.

Note that, on an average, cottonseed is 1.7 times the yield of lint, or is 63 per cent of the weight of seed cotton.

Yields of cotton are customarily reported in bales. A bale contains an average of 478 pounds of lint, but weight of bagging, straps, and ties brings the gross weight to about 500 pounds.

Example of Cost of Producing Cotton

INPUTS PER ACRE FOR COTTON PRODUCTION				
9-Hour Day	Yield 750 lbs. of Lint, 1,950 lbs. of Seed Cotton			
Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 20T 3-14" plow	9.0	1.0	1.0
Disking (2 times)	1M 20T 10' double disk	30.0	0.6	0.6
Harrowing (2 times)	1M 20T 20' spike harrow	60.0	0.3	0.3
Bordering	1M 20T disk ridger and 0.2 M/hrs.	30.0	0.3	0.3
Irrigation	2 M/hrs.		2.0	
Disking	1M 20T 10' double disk	30.0	0.3	0.3
Planting	3M 10T 2-2-row planters	30.0	0.9	0.3
Cultivating (5 times)	1M 10T 4-row cultivator	22.5	2.0	2.0
Chopping	5 M/hrs.		5.0	
Hoeing (2 times)	2 M/hrs.		4.0	
Irrigating (4 times)	2 M/hrs.		8.0	
Picking	By the pound			
Weighing	2.5 M/hrs.		2.5	
Hauling (20 truck mi.)	1M pickup trailer	3.0	3.0	
Total truck miles 20.0	Total hours per acre		30.1	4.8

COST PER ACRE FOR COTTON PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
General labor	0.8	\$0.85	\$ 0.68
Tractor driver	4.8	1.00	4.80
Irrigating	10.0	0.90	9.00
Chopping and hoeing	9.0	0.80	7.20
Weighing	2.5	1.00	2.50
Hauling	3.0	1.00	3.00
Total cost of labor			\$27.18

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COST PER ACRE FOR COTTON PRODUCTION

CONTINUED

	Hours	Rate per hour	Cost
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	2.3	\$0.72	\$ 1.66
Tractor 20 HP track	2.5	1.48	3.70
Truck (20 miles at 12.1¢)			2.42
Trailer 4 wheel	3.0	0.08	0.24
Plow 3-14"	1.0	0.17	0.17
Disk 10' double	0.9	0.27	0.25
Harrow 20' spike	0.3	0.04	0.01
Disk ridger	0.3	0.08	0.02
Planter 2-row	0.6	0.11	0.07
Cultivator 4-row	2.0	0.18	0.36
Total cost of power units and equipment			\$ 8.90
<u>Contract and Piece Work</u>			
Picking: 1,950 lbs. at \$3.50 cwt.*			68.25
Ginning: 1,950 lbs. at 60¢ cwt.			11.70
Total cost of contract and piece work			\$79.95
<u>Materials</u>			
Seed: 30 lbs. at 7.5¢			2.25
Irrigation water: 2.5 acre ft. at \$3			7.50
Bags and ties: 1.5 bales at \$3.75			5.63
Total cost of materials			\$15.38
<u>Miscellaneous</u>			
Taxes			6.00
Management			15.00
Interest: 4 per cent of \$400			16.00
Insurance: 55¢ per bale for minimum of 20 days plus 5 ¢ from field to gin			0.90
Compensation insurance: \$1.24 per \$100 payroll			0.18
Total miscellaneous cost			\$38.08
Total cost per acre \$169.49	Credit for cottonseed \$35.00		
Net cost per acre \$134.49	Cost per pound of lint 17.9¢		

*Hand picking. Machine picking = \$1.25 to 1.75 per 100 lbs.

DATES

Principal Producing Areas

Of about 4,300 acres in date "gardens," 4,100 acres are credited to the Coachella valley in Riverside County, and with the balance in Imperial County, Inyo, San Diego, and San Bernardino.

Environmental Requirements

Soil.—The date palm does best on well drained sandy or gravelly loam soil, at least 12 feet in depth, free from a high water table, and freedom from excess alkali. Rainfall is not essential since irrigation is vital.

Climate.—The date, a desert native, requires a climate characterized by high summer heat of 100 degrees or more for a period of several months; hot

nights; freedom from cold (other than light frosts and only prior to the blossoming time); absolute freedom from rain during pollinating time; low humidity and rainless period during the ripening of fruit. Date palms have a 12-months growing period and do best when the minima temperatures do not fall much below 60 degrees with no limit on maxima temperatures.

Topography.—Level land to permit efficient and economical handling of irrigation water is essential.

Water Supply.—An adequate supply of water is needed since a date palm grove requires several acre feet of water to promote growth and insure production.

Yield Per Acre
(Mature Trees)

Usual	5,000 lbs.
Good	8,000 lbs.
Exceptional	10,000 lbs.

These figures are for Deglet Noor: soft varieties produce about two third these figures.

Self-Sustaining Crop.—6 to 7th year.

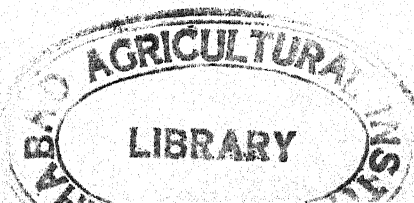
Full Bearing.—12th to 14th year.

Production Life.—Not known—believed to be "100 years plus."

Example of Cost of Producing Dates

INPUTS PER ACRE FOR DATE PRODUCTION
9-Hour Day Yield 8,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Disking (2 times)	1M 10T 6' double disk	20.0	0.9	0.9
Seeding cover crop	1M	10.0	0.9	
Harrowing	1M 10T 10' spike harrow	30.0	0.3	0.3
Plowing	1M 10T 2-14" plow	7.0	1.3	1.3
Spreading manure	1M 10T manure spreader	1.0	9.0	2.0
Disking (2 times)	1M 10T 6' double disk	20.0	0.9	0.9
Establish basins (3 times)	1M 10T disk ridger	15.0	1.8	1.8
Irrigating (24 times)	1-1/4 M/hr. per time		30.0	
Pruning	20 M/hrs.		20.0	
Brush disposal	6 M/hrs.		6.0	
Pollinizing	15 M/hrs.		15.0	
Thinning	15 M/hrs.		15.0	
Tying	10 M/hrs.		10.0	
Sulphuring (3 times)	2/3 M/hrs.		2.0	
Bagging	15 M/hrs.		15.0	
Picking	By cwt.			
Hauling to packing shed	By cwt.			
Miscellaneous tree care	4 M/hrs.		4.0	
Total hours per acre			132.1	7.2



COST PER ACRE FOR DATE PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
General labor	19.9	\$0.85	\$ 16.90
Bagging	15.0	0.85	12.75
Tractor driver	7.2	1.00	7.20
Irrigating	30.0	0.85	25.50
Pruning	20.0	0.85	17.00
Pollinizing	15.0	0.85	12.75
Thinning	15.0	0.85	12.75
Tying	10.0	0.85	8.50
Total cost of labor			\$115.94
<u>Power Units and Equipment</u>			
Tractor 10 HP Wheeled	7.2	0.72	5.18
Pruning equipment	20.0	0.01	0.20
Plow 2-14"	1.3	0.15	0.20
Disk 6' double	1.8	0.11	0.20
Harrow 10' spike	0.3	0.02	0.01
Disk ridger	1.8	0.08	0.14
Manure spreader	9.0	0.12	1.08
Picking equipment, ladders, etc.			5.00
Total cost of power units and equipment			\$ 12.01
<u>Contract and Piece Work</u>			
Picking: 80 cwt. at \$1.80			144.00
Hauling to packing house: 80 cwt. at 15¢			12.00
Total cost of contract and piece work			\$156.00
<u>Materials</u>			
Manure: 8 tons at \$12			96.00
Melilotus seed: 20 lbs. at 12¢			2.40
Twine for tying clusters			2.00
Sulphur: 15 lbs. at 6¢			0.90
Irrigation water: 9 acre ft. at \$4.50			40.50
Protection bags			9.00
Total cost of materials			\$150.80
<u>Miscellaneous</u>			
Taxes			25.00
Management			26.00
Depreciation of trees: \$2,000 to establish, 40 yrs. of economic life			50.00
Interest: 4 per cent of \$1,500			60.00
Compensation insurance: \$2.30 per \$100 payroll			1.80
Total miscellaneous cost			\$162.80
Total cost per acre	\$597.55	Cost per pound	7.5¢

FIGS

Principal Producing Areas

Kadota figs are produced chiefly in Merced County followed by Fresno, Tulare and San Joaquin Counties.

Fresno County has the largest acreage of figs other than Kadota (13,000 acres) with additional acreages in Merced, Yolo, and Madera Counties.

Environmental Requirements

Soil.—The fig prefers a rich, warm loam or clay loam soil well supplied with lime and organic matter. The soil should be at least 6 to 8 feet deep and free from alkali and other injurious salts. In several localities relatively shallow soils have been utilized after the hardpan has been blasted, but good land is essential if high yields of quality fruit are to be obtained. One should avoid planting on sandy soil which is infested with nematodes.

Climate.—The fig is best adapted to a climate having a cool dormant season, but not cold enough to cause freezing. The growing season should be long, hot, and dry; free from sudden temperature changes, frosts, and cold spells. Warm, dry weather is essential at harvest time. During the growing season a range between the maximum temperature of 100 degrees Fahrenheit and a minimum temperature of 65 degrees Fahrenheit is desirable. The growing season in California begins about the first of April and continues through November, there being two crops produced annually except for the Calimyrna variety, which yields only one crop of merchantable figs.

Figs have been successfully grown in California at altitudes ranging from -100 feet to 2,500 feet above sea level.

Climatic conditions favorable to the fig tend to be found in areas of low rainfall. For this reason irrigation is essential to provide the 24 to 30 inches of water needed each year. Level land or land gently rolling is required in order to facilitate proper irrigation.

Topography.—Level land to permit efficient and economical use of irrigation.

Yields Per Acre (Orchards in Full Production)

Variety	Usual	Good	Exceptional	Drying ratio*
Kadota (fresh)	4.0 tons	6.0 tons	8.0 tons	3:1
Calimyrna (dried)	0.6	1.25	1.5	3:1
Adriatic (dried)	1.0	2.0	3.0	3:1
Mission (dried)	1.5	2.5	3.5	3:1

	Kadotas	Others
Age to Self-sustaining Crop	4 to 5 years	6 to 7 years
Age to Full Production	8 to 10 years	10 to 14 years
Estimated Productive Life	Until 60 years	Until 40 years

Examples of Cost of Producing Figs

Because most fig growers use a combination of outlets for their product no single set of cost data is entirely applicable. Some figs may be sold to a certain extent as fresh figs, the balance being dried. Other figs may be both sold to a cannery and dried. Others may be entirely dried. However, as indicative of costs examples are set forth as follows:

1. Adriatics (dried)
2. Calimyrnas (dried)
3. Kadotas (cannery stock)
4. Missions (dried)

All orchards used in these examples are deemed to be in full bearing and located in suitable environmental conditions. Number of trees per acre are: Missions 27; Kadotas 70; Adriatics and Calimyrnas 48.

*Drying ratio based on fresh figs. Frequently this ratio is reported as 2:1 or 1.5:1 partly dried on the tree and on the ground before being collected for final drying.

INPUTS PER ACRE FOR ADRIATIC FIG PRODUCTION
9-Hour Day Yield 2 Tons Dried

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Broadcast cover crop	2M 20T broadcaster	40.0	0.4	0.2
Harrowing	1M 20T 12' spike harrow	25.0	0.4	0.4
Spraying	3M 20T 300 gal. sprayer	12.0	2.4	0.8
Pruning, brush disposal	10 M/hrs.		10.0	
Disking (2 times)	1M 20T 5' double disk	12.0	1.5	1.5
Furrowing (3 times)	1M 20T 4-shovel furrower	20.0	1.4	1.4
Irrigating (3 times)	3 M/hrs.		9.0	
Cultivate (2 times)	1M 20T 5' double disk	12.0	1.5	1.5
Fertilizing	2M 20T broadcaster	40.0	0.4	0.2
Dragging (2 times)	1M 20T 12' drag	15.0	1.2	1.2
Distributing picking equipment	2M 20T trailer	25.0	0.8	0.4
Collecting	Contract			
Hauling to dry yard (15 truck miles)	2M 1-1/2 Tr.	3.0	6.0	
Drying	66 M/hrs.		66.0	
Hauling to packer	By ton			
Clean up work	5 M/hrs.		5.0	
Misc. tree care	4 M/hrs.		4.0	
Total truck miles 15.0	Total hours per acre		110.0	7.6

COST PER ACRE FOR ADRIATIC FIG PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor and truck driver	10.6	\$1.00	\$10.60
Irrigating	9.0	0.85	7.65
Pruning	10.0	0.85	8.50
Drying	66.0	0.85	56.20
Other labor	14.4	0.85	12.32
Total cost of labor			\$95.27
<u>Power Units and Equipment</u>			
Tractor 20 HP track	7.6	1.48	11.25
Truck (15.0 miles at 12.1¢)			1.82
Trailer	0.4	0.05	0.02
Drag 12' plank	1.2	0.01	0.01
Sprayer 300 gallons	0.8	0.53	0.42
Harrow 12' spike	0.4	0.02	0.01
Disk 6' double	3.0	0.11	0.33
Furrower 6-shovel	1.4	0.10	0.14
Picking equipment			0.30
Pruning equipment	10.0	0.01	0.10
Sweat boxes: 22 at 25¢			5.50
Drying trays: 80 3' x 6' at 18¢			14.40
Lug boxes: 200 at 1-1/2¢			3.00
Broadcaster	0.4	0.05	0.02
Total cost of power units and equipment			\$37.32

COST PER ACRE FOR ADRIATIC FIG PRODUCTION

CONTINUED

	Cost
<u>Contract and Piece Work</u>	
Collecting (40 lb. box of fresh fruit based on 2:1 drying ratio) 200 boxes at 22¢	\$44.00
Fumigating (2 times): 2 ton at 80¢ per ton per time	3.20
Hauling to packer: 2 ton at \$1.75	3.50
Total cost of contract and piece work	\$50.70
<u>Materials</u>	
Irrigation water: 2 acre ft. at \$2.50	5.00
Melilotus seed: 20 lbs. at 12¢	2.40
Ammonium sulphate fertilizer: 500 lbs. at \$53 ton	13.25
Oil for spray (4 per cent oil spray at 150 gal./acre): 6 gal. at 15-1/2¢	0.93
Total cost of materials	\$21.58
<u>Miscellaneous</u>	
Taxes	8.00
Management	30.00
Depreciation of trees: \$240 to establish, 40 yrs. productive life	6.00
Interest: 4 per cent of \$700	28.00
Compensation insurance: \$2.30 per \$100 payroll	2.00
Total miscellaneous cost	\$74.00
Total cost per acre	\$278.87
Cost per pound dried	7.0¢

INPUTS PER ACRE FOR CALIMYRNA FIG PRODUCTION
9-Hour Day Yield 1.25 Tons Dried

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Broadcast cover crop	2M 20T broadcaster	40.0	0.4	0.2
Harrowing	1M 20T 12' spike harrow	25.0	0.4	0.4
Spraying	3M 20T 300-gal. sprayer	12.0	2.4	0.8
Pruning, brush disposal	12M/hrs.		12.0	
Disking (2 times)	1M 20T 6' double disk	12.0	1.5	1.5
Furrowing (3 times)	1M 20T 4-shovel furrower	20.0	1.4	1.4
Irrigating (3 times)	3 M/hrs.		9.0	
Cultivate (2 times)	1M 20T 6' double disk	12.0	1.5	1.5
Fertilizing	2M 20T broadcaster	40.0	0.4	0.2
Caprifying	9 M/hrs.		9.0	
Dragging (2 times)	1M 20T 12' drag	15.0	1.2	1.2
Distributing picking equipment	2M 20T trailer	25.0	0.8	0.4
Collecting	Contract			
Hauling to dry yard (12 truck miles)	2M 1-1/2 Tr.	4.0	4.4	
Drying	37.5 M/hrs.		37.5	
Sorting	12.5 M/hrs.		12.5	
Placing in sweat boxes	3.3 M/hrs.		3.3	
Hauling to packer	By the ton			
Clean up work	5 M/hrs.		5.0	
Misc. tree care	4 M/hrs.		4.0	
Total truck miles 12.0			106.7	7.6

COST PER ACRE FOR CALIMYRNA FIG PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Caprifying	9.0	\$0.85	\$ 7.65
Tractor driver	9.8	1.00	9.80
Irrigating	9.0	0.85	7.65
Pruning	12.0	0.85	10.20
Drying, sorting, placing in sweat boxes	53.3	0.85	45.30
Other labor	13.6	0.85	11.56
Total cost of labor			\$92.16
<u>Power Units and Equipment</u>			
Tractor 20 HP track	7.6	1.48	11.25
Truck (12 miles at 12.1¢)			1.45
Trailer	0.4	0.05	0.02
Drag 12' plank	1.2	0.01	0.01
Sprayer 300 gallon	0.8	0.53	0.42
Harrow 12' spike	0.4	0.02	0.01
Disk 6' double	3.0	0.11	0.33
Disk checker	1.4	0.10	0.14
Picking equipment			0.30
Pruning equipment	12.0	0.01	0.12
Sweat boxes: 14 at 18¢			2.52
Drying trays: 50 3' x 6' at 18¢			9.00
Wire baskets for caprifying			2.00
Lug boxes: 125 at 1-1/2¢			1.88
Broadcaster	0.4	0.05	0.02
Total cost of power units and equipment			\$29.47
<u>Contract and Piece Work</u>			
Collecting (per 40 lb. box of fresh fruit based on 2:1 drying ratio)			
125 boxes at 22¢			27.50
Fumigating (2 times): 1.25 tons at 80¢ per ton per time			2.00
Hauling to packer: 1.25 tons at \$1.75			2.19
Total cost of contract and piece work			48.46
<u>Materials</u>			
Caprifigs: 1,500 at \$7.50 per 1,000			11.25
Irrigation water: 2 acre ft. at \$2.50			5.00
Melilotus seed: 20 lbs. at 12¢			2.40
Ammonium sulphate fertilizer: 500 lbs. at \$53 ton			13.25
Oil for spray (4 per cent oil spray at 150 gal./acre)			
6 gal. at 15-1/2¢			0.93
Total cost of materials			32.83
<u>Miscellaneous</u>			
Taxes			8.00
Management			30.00
Depreciation of trees: \$240 to establish, 40 yrs. productive life			6.00
Interest: 4 per cent of \$600			24.00
Compensation insurance: \$2.30 per \$100 payroll			1.75
Total miscellaneous cost			\$69.75
Total cost per acre	\$272.67	Cost per pound dried	10.9¢

INPUTS PER ACRE FOR PRODUCTION OF KADOTA FIGS FOR CANNING
 9-Hour Day Yield 6 Tons

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Broadcast cover crop	2M 20T broadcaster	40.0	0.4	0.2
Harrowing	1M 20T 12' spike harrow	25.0	0.4	0.4
Spraying	3M 20T 300-gal. sprayer	12.0	2.4	0.8
Pruning, brush disposal	20 M/hrs.		20.0	
Disking (2 times)	1M 20T 6' double disk	12.0	1.5	1.5
Furrowing (3 times)	1M 20T 4-shovel furrower	20.0	1.4	1.4
Irrigating (3 times)	3 M/hrs.		9.0	
Cultivating (2 times)	1M 20T 6' double disk	12.0	1.5	1.5
Fertilizing	2M 20T broadcaster		0.4	0.2
Distributing picking equipment	2M 10T trailer	25.0	0.8	0.4
Picking	By the box			
Hauling to canner	Contract			
Cleanup work	5/hrs.		5.0	
Misc. tree care	4 M/hrs.		4.0	
Total hours per acre			46.8	6.4

COST PER ACRE FOR PRODUCTION OF KADOTA FIGS FOR CANNING

<u>Labor</u>	Hours	Rate per hour	Cost
Tractor driver	6.4	\$1.00	\$ 6.40
Irrigating	9.0	0.85	7.65
Pruning	20.0	0.85	17.00
Other labor	11.4	0.85	9.70
Total cost of labor			\$ 40.75
<u>Power Units and Equipment</u>			
Tractor 20 HP track	6.4	1.48	9.47
Trailer	0.4	0.05	0.02
Sprayer 300 gallon	0.8	0.53	0.42
Harrow 12' spike	0.4	0.02	0.01
Disk 6' double	3.0	0.11	0.33
Furrower 4-shovel	1.4	0.10	0.14
Picking equipment			0.30
Pruning equipment	30.0	0.01	0.20
Total cost of power units and equipment			\$ 10.89
<u>Contract and Piece Work</u>			
Picking (40 lb. boxes): 300 boxes at 35¢			105.00
Hauling to cannery: 6 tons at \$1.75			10.50
Total cost of contract and piece work			\$115.50
<u>Materials</u>			
Irrigation water: 2.0 acre ft. at \$2.50			5.00
Melilotus seed: 20 lbs. at 12¢			2.40
Ammonium sulphate fertilizer: 500 lbs. at \$53 ton			13.25
Oil for spray (4 per cent oil spray at 150 gal. per acre)			
6 gal. at 15-1/2¢			0.93
Total cost of materials			\$ 21.58

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COST PER ACRE FOR PRODUCTION OF KADOTA FIGS FOR CANNING

CONTINUED

	Cost
<u>Miscellaneous</u>	
Taxes	\$ 8.00
Management	30.00
Depreciation of trees: \$280 to establish, 40 yrs. productive life	7.00
Interest: 4 per cent of \$800	32.00
Compensation insurance: \$2.30 per \$100 payroll	2.30
Total miscellaneous cost	<u>\$79.30</u>
Total cost per acre \$268.02	Cost per ton \$44.67

INPUTS PER ACRE FOR MISSION FIG PRODUCTION
9-Hour Day Yield 2.5 Tons Dried

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Broadcast cover crop	2M 20T broadcaster	40.0	0.4	0.2
Harrowing	1M 20T 12' spike harrow	25.0	0.4	0.4
Spraying	3M 20T 300-gal. sprayer	12.0	2.4	0.8
Pruning, brush removal	15 M/hrs.		15.0	
Disking (2 times)	1M 20T 6' double disk	12.0	1.5	1.5
Furrowing	1M 20T 4-shovel furrower	20.0	1.4	1.4
Irrigating (3 times)	3 M/hrs.		9.0	
Cultivating	1M 20T 6' double disk	12.0	1.5	1.5
Fertilizing	2M 10T broadcaster	40.0	0.4	0.2
Clean up work	5 M/hrs.		5.0	
Dragging (2 times)	1M 10T 12' drag	15.0	1.2	1.2
Distributing harvesting equipment	2M 10T trailer	25.0	0.8	0.4
Collecting	Contract			
Hauling to dry yard (15 truck miles)	2M 1-1/2 Tr.	2.0	9.0	
Drying	34.5 M/hrs.		57.5	
Sorting	12 M/hrs.		20.0	
Placing in sweat boxes	4 M/hrs.		6.6	
Misc. tree care	4 M/hrs.		4.0	
Total truck miles 15.0	Total hours per acre		136.1	7.6

COST PER ACRE FOR MISSION FIG PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor and truck driver	12.1	\$1.00	\$ 12.10
Irrigating	9.0	0.85	7.65
Pruning	15.0	0.85	12.75
Drying, sorting, placing in sweat boxes	84.1	0.85	71.50
Other labor	15.9	0.85	13.52
Total cost of labor			<u>\$117.52</u>

COST PER ACRE FOR MISSION FIG PRODUCTION

CONTINUED

	Hours	Rate per hour	Cost
<u>Power Units and Equipment</u>			
Tractor 20 HP track	7.6	\$1.48	\$11.25
Truck (15.0 miles at 12.1¢)			1.82
Trailer	0.4	0.05	0.02
Drag 12' plank	1.2	0.01	0.01
Sprayer 300 gallon	0.8	0.53	0.42
Harrow 12' spike	0.4	0.02	0.01
Disk 5' double	3.0	0.11	0.33
Disk checker	1.4	0.10	0.14
Pruning equipment	15.0	0.01	0.15
Picking equipment			1.05
Sweat boxes: 28 at 25¢			7.00
Drying trays: 100 3' x 6' at 18¢			18.00
Lug boxes: 250 at 1-1/2¢			3.75
Total cost of power units and equipment			\$43.95
<u>Contract and Piece Work</u>			
Collections (per 40 lb. box of fresh fruit based on 2:1 drying ratio 250 boxes at 22¢)			55.00
Fumigating (2 times): 2.5 tons at 80¢ per ton per time			4.00
Hauling to packer: 2.5 tons at \$1.75			4.38
Total cost of contract and piece work			\$63.38
<u>Materials</u>			
Irrigation water: 2 acre ft. at \$2.50			5.00
Melilotus seed: 20 lbs. at 12¢			2.40
Ammonium sulphate fertilizer: 500 lbs. at \$53 ton			13.25
Oil for spray (4 per cent oil spray at 150 gal. per acre) 6 gal. at 15-1/2¢			0.93
Total cost of materials			\$21.58
<u>Miscellaneous</u>			
Taxes			6.00
Management			30.00
Depreciation of trees: \$240 to establish, 60 yrs. productive life			4.00
Interest: 4 per cent of \$500			20.00
Compensation insurance: \$2.30 per \$100 payroll			2.45
Total miscellaneous cost			\$62.45
Total cost per acre	\$308.88	Cost per pound dried	6.2¢

FLAX

Principal Producing Areas

Most of the production is in Imperial and Fresno counties with only small plantings in other sections.

Environmental Requirements

Soil.—Moist, friable loams or clay loams; at least three feet in depth; fairly rich in organic matter and plant foods; free from alkali or other injurious salts. Land clean of weeds and flax diseases is essential.

Climate.—Sunny but cool weather conditions; mostly a winter crop in California; minima and maxima temperatures of not less than 32 degrees nor more than 80 are best. Usually grown as an irrigated crop, hence annual amount of rainfall is not a primary essential.

Topography.—Land level enough to permit handling irrigation water efficiently and economically.

Yield Per Acre

Usual	1,000 lbs. (16 bushels of 56 lbs.)
Good	1,400 lbs. (25 bushels of 56 lbs.)
Exceptional	2,000 lbs. (35 bushels of 56 lbs.)

Note: Usually reported in bushels of 56 lbs. net.

Examples of Cost of Producing Flax

Calculations of costs are shown below for a yield of 1,400 pounds per acre. Growing flax follows the plan of procedure for the various small grains generally.

INPUTS PER ACRE FOR FLAX PRODUCTION

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Establish basins	1M 20T disk ridger	60.0	0.2	0.2
Preirrigating	3 M/hrs.		3.0	
Plowing	1M 20T 3-14" plow	9.0	1.0	1.0
Disking (2 times)	1M 20T 20' single disk	40.0	0.4	0.4
Harrowing (2 times)	1M 20T 20' spike harrow	40.0	0.4	0.4
Seeding	2M 20T 2-10' drills	35.0	0.6	0.3
Crop irrigating	3 M/hrs.		3.0	
Harvesting	4M 20T 12' combine	10.0	3.6	0.9
Hauling to warehouse	Contract			
Total hours per acre			12.2	3.2

COST PER ACRE FOR FLAX PRODUCTION

	Hours	Rate per hour	Cost
Labor			
Tractor driver	3.2	\$1.00	\$ 3.20
Irrigating	6.0	1.00	6.00
Harvesting	2.7	1.00	2.70
Other labor	0.3	1.00	0.30
Total cost of labor			\$12.20
Power Units and Equipment			
Tractor 20 HP track	3.2	1.48	4.74
Disk ridger	0.2	0.08	0.02
Plow 3-14"	1.0	0.17	0.17
Disk 20' single	0.4	0.30	0.12
Harrow 20' spike	0.4	0.02	0.01
Drill 10'	0.6	0.31	0.19
Combine 12'	0.9	1.15	1.04
Total cost of power units and equipment			\$ 6.29

COST PER ACRE FOR FLAX PRODUCTION

CONTINUED

	Cost
<u>Contract and Piece Work</u>	
Hauling to warehouse: 1,400 lbs. at \$2 ton	\$ 1.40
Total cost of contract and piece work	\$ 1.40
<u>Materials</u>	
Storing—six months: 0.7 tons at \$1	0.70
Seed: 40 lbs. at 6¢	2.40
Irrigation water: 1 acre ft. at \$2	2.00
Sacks and twine: 13 at 20¢	2.60
Total cost of materials	\$ 7.70
<u>Miscellaneous</u>	
Insuring—six months: 83¢ per \$100 valuation value \$3 per bushel	0.62
Taxes	4.00
Management	15.00
Interest: 4 per cent of \$400	16.00
Compensation insurance: \$4.20 per \$100 payroll	0.50
Total miscellaneous cost	\$36.12
Total cost per acre \$63.71	Cost per bushel \$2.55

GRAIN HAY

Principal Producing Areas

Hay made from growing barley, wheat, oats, and occasionally rye is produced throughout the state wherever small grains are grown. Counties of major production in order of importance are: Sonoma, Contra Costa, Los Angeles, Alameda, San Luis Obispo, Sacramento, and San Diego.

Environmental Requirements

Grain hay is grown under a great variety of soils, climatic conditions, and topographies. Therefore, specific statements as to suitable conditions are not required. In general, the information set out under the individual small grains likewise apply to grain hay.

Yields Per Acre
(Dry Farmed)

	Rolling hills	Level land	Irrigated
Usual	3/4 ton	1 ton	2 tons
Good	1-1/2 tons	2 tons	3 tons
Exceptional	2-1/2 tons	3 tons	4 tons

The acreage grown under irrigation, however, is small.

Examples of Costs of Producing Grain Hay

Examples are shown for (a) rolling hills, and (b) level land, both under dry farmed conditions. Costs will vary somewhat depending on what small grain is being used for hay, but the differences are not significant.

INPUTS PER ACRE FOR GRAIN HAY PRODUCTION ON ROLLING HILLS
9-Hour Day Yield 1.5 Tons

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Disking (2 times)	1M 20T 8' double disk	15.0	1.2	1.2
Harrowing	1M 20T 20' spike harrow	40.0	0.2	0.2
Drilling	1M 20T 10' drill	20.0	0.4	0.4
Mowing	1M 10T 7' mower	20.0	0.4	0.4
Raking	1M 10T 12' dump rake	25.0	0.4	0.4
Bucking	1M power buckrake	12.0	0.8	
Baling	5M 10T baler	12.0	4.0	0.8
Hauling (3 miles)	2M 1-1/2 Tr.	8.0	2.2	
Total truck miles 3.0		Total hours per acre	9.6	3.4

COST PER ACRE FOR GRAIN HAY PRODUCTION ON ROLLING HILLS

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor and truck driver	4.5	\$1.00	\$ 4.50
Baler crew	3.2	1.00	3.20
Other labor	1.9	1.00	1.90
Total cost of labor			\$ 9.60
<u>Power Units and Equipment</u>			
Tractor 10 HP wheel	1.6	0.72	1.15
Tractor 20 HP track	1.8	1.48	2.66
Truck (3.0 miles at 12.1¢)			0.36
Disk 8' double	1.2	0.15	0.18
Harrow 20' spike	0.2	0.04	0.01
Mower 7' tractor	0.4	0.10	0.04
Rake 12' dump	0.3	0.07	0.02
Buckrake, power	0.8	0.88	0.70
Baler, stationary	0.8	0.30	0.24
Total cost of power units and equipment			\$ 5.36
<u>Materials</u>			
Seed: 100 lbs. at \$3.75 cwt.			3.75
Baling wire: 50¢ a ton			0.75
Total cost of materials			\$ 4.50
<u>Miscellaneous</u>			
Taxes			1.50
Management			5.25
Interest: 4 per cent of \$150			6.00
Compensation insurance: \$4.20 per \$100 payroll			0.25
Insurance on hay: \$1.50 per \$100; 1.5 tons at \$23			0.52
Total miscellaneous cost			\$13.52
Total cost per acre \$32.98	Cost per ton \$21.99		

INPUTS PER ACRE FOR GRAIN HAY PRODUCTION ON LEVEL LAND
9-Hour Day Yield 2 Tons

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 30T 4-14" plow	12.0	0.8	0.8
Disking (2 times)	1M 30T 20' single disk	45.0	0.4	0.4
Harrowing	1M 30T 20' spike harrow	50.0	0.2	0.2
Seeding	2M 30T 2-10' drills	50.0	0.4	0.2
Mowing	1M 10T 7' mower	22.0	0.4	0.4
Raking	1M 10T 10' side delivery rake	22.0	0.4	0.4
Baling	3M 10T 2-wire pickup baler	16.5	1.5	0.5
Hauling (6 miles)	2M 1-1/2 Tr. bale loader	9.0	2.0	
Total truck miles 6.0		Total hours per acre	6.1	2.9

COST PER ACRE FOR GRAIN HAY PRODUCTION ON LEVEL LAND

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor and truck driver	3.9	\$1.00	\$ 3.90
Baling crew	1.0	1.00	1.00
Other labor	1.2	1.00	1.20
Total cost of labor			\$ 6.10
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	1.3	0.72	0.94
Tractor 30 HP track	1.6	2.02	3.23
Truck (6.0 miles at 12.1¢)			0.73
Plow 4-14"	0.8	0.27	0.23
Disk 20' single	0.4	0.30	0.12
Harrow 20' spike	0.2	0.05	0.01
Drill 10'	0.4	0.31	0.12
Mower 7'	0.4	0.10	0.04
Rake 10' side delivery	0.4	0.15	0.06
Baler 2-wire pickup	0.5	0.82	0.41
Bale loader	1.0	0.10	0.10
Total cost of power units and equipment			\$ 5.99
<u>Materials</u>			
Seed: 100 lbs. at \$3.75 cwt.			3.75
Baling wire at 50¢ ton			1.00
Total cost of materials			\$ 4.75
<u>Miscellaneous</u>			
Taxes			3.00
Management			5.25
Interest: 4 per cent of \$200			8.00
Compensation insurance: \$4.20 per \$100 payroll			0.17
Insurance on hay: \$1.50 per \$100 - 2 tons at \$23			0.69
Total miscellaneous cost			\$17.11
Total cost per acre \$33.95		Cost per ton \$16.98	

GRAIN SORGHUM

Principal Producing Areas

Grain Sorghums are produced generally throughout the Sacramento and San Joaquin valleys and in Imperial County. Imperial County is credited with the largest acreage of all but there are substantial acreages in Sacramento; Tulare, Sutter, and Kern counties.

Environmental Requirements

Soil.—Loam or sandy loam soil, 3 feet or more in depth, fairly well supplied with organic matter and plant foods; free from alkali or other injurious salts.

Climate.—Warm to hot sunny weather, free from frosts, cold nights, high humidity; does best under conditions of high temperatures, low humidity, warm nights. Freedom from rains at harvest time essential. Not well adapted to the cool coast or high mountain climates. Has a growing season of about 5 months (April 15–September, or June–October) when minima temperatures should not fall below 50. Will stand maxima temperatures of over 100 degrees.

Topography.—Areas adapted by reason of soil and climate to the production of milo tend to be inadequate as to rainfall requirements so that irrigation is customarily a requirement. Hence, land sufficiently level to permit proper use of irrigation facilities and water is essential.

Yield Per Acre
(Threshed Grain)

Usual	1,500 lbs.
Good	2,500 lbs.
Exceptional	3,500 lbs.

Example of Cost of Producing Grain Sorghum

INPUTS PER ACRE FOR GRAIN SORGHUM PRODUCTION
9-Hour Day Yield 2,500 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 20T 4-14" plow	10.0	0.9	0.9
Disking	1M 20T 10' double disk	22.0	0.4	0.4
Bordering	1M 20T disk ridger	40.0	0.2	0.2
Irrigating	3 M/hrs.		3.0	
Disking	1M 20T 10' double disk	22.0	0.4	0.4
Harrowing	1M 20T 20' spike harrow	60.0	0.2	0.2
Seeding	1M 10T 4-row planter	20.0	0.4	0.4
Cultivating (3 times)	1M 10T 4-row cultivator	30.0	0.9	0.9
Irrigating (3 times)	4 M/hrs.		12.0	
Combining	3M 20T 12' combine	20.0	1.2	0.4
Hauling to warehouse (40 truck miles)	1M 1-1/2 Tr.	20.0	9.0	
Total truck miles 40.0	Total hours per acre		28.6	3.8

COST PER ACRE FOR GRAIN SORGHUM PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor and truck driver	12.8	\$1.00	\$12.80
Irrigating	15.0	1.00	15.00
Harvesting	0.8	1.00	0.80
Total cost of labor			\$28.60
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	1.3	0.72	0.94
Tractor 20 HP track	2.5	1.48	3.70
Truck (40.0 miles at 12.1¢)			4.84
Plow 4-14"	0.9	0.27	0.25
Disk 10' double	0.8	0.27	0.23
Disk ridger	0.2	0.08	0.02
Harrow 20' spike	0.2	0.04	0.01
Combine 12'	0.4	1.15	0.46
Planter 4-row	0.4	0.19	0.08
Cultivator 4-row	0.9	0.18	0.16
Total cost of power units and equipment			\$10.69
<u>Materials</u>			
Seed: 6 lbs. at 3¢			0.18
Irrigation water: 1.5 acre ft. at \$3			4.50
Sacks: 18 at 20¢			3.60
Total cost of materials			\$ 8.28
<u>Miscellaneous</u>			
Taxes			3.00
Management			15.00
Interest: 4 per cent of \$350			14.00
Storing: 2,500 lbs. at \$1.75 ton			2.19
Insuring: 50¢ ton			0.62
Compensation insurance: \$4.20 per \$100 payroll			0.63
Total miscellaneous cost			\$35.44
Total cost per acre \$83.01	Cost per cwt. \$3.32		

GRAPES

Grape vineyards in California are set to varieties for one of three primary uses: (a) for use as table grapes, (b) for converting into raisins, and (c) for wine making. Wine making varieties are either varieties for (1) sweet wines or (2) dry wines. Some use is made of surplus table and raisin varieties for conversion into sweet wines, but this use is incidental or secondary to the primary purpose for which these varieties are produced.

Principal Producing Areas

Of approximately 91,000 acres of table grape vineyards in California, counties possessing main acreages (in order of importance) are: Tulare, San Joaquin, Fresno, and Kern.

Of about 230,000 acres of raisin varieties, counties having 10,000 acres or more (in order of importance) are: Fresno (with 57 per cent of the total), Tulare, Madera, Kern, and Merced.

Of about 158,000 acres of wine varieties, counties in order of principal importance are: San Joaquin, San Bernardino, Sonoma, Fresno, Napa, and Stanislaus.

Environmental Requirements

Soil.—(Table, sweet wine, and raisin varieties). Deep, fertile loams or sandy loams; at least five feet in depth; free from high watertables and injurious salts.

(Dry wine varieties). Sandy or fine sandy loams, well drained, retentive of moisture; at least three feet in depth; free from alkali or other injurious salts.

Climate.—(Table, sweet wine, and raisin varieties). Warm-to-hot sunny growing season of from 6-7 months (middle of March to last of October), free from frosts, cold winds, humidity; freedom from rains during picking time. Table grapes require a climate that favors simultaneous development of sugar content and color. Minima and maxima temperatures during the growing season are about 60 and 100 degrees. Since these varieties are generally irrigated, annual precipitation is important only insofar as it affects the supply and quality of irrigation water.

(Dry wine varieties). Climate appears to have a special significance in determining the quality of the wine made from grapes grown in various localities. In general dry wine grapes respond favorably to dry, warm to even hot temperatures during the growing season with minima and maxima temperatures of 60 and 90 degrees respectively. Special inquiry should be made to determine the suitability of a locality for the varieties now being grown or which may be considered for planting. The subject is too technical for inclusion in this Manual. Rainfall is an essential consideration. Most of the dry wine acreage is nonirrigated so that an annual precipitation is required of from 15 to 24 inches, preferably the latter. Freedom from rains prior to or during picking time is essential.

Topography.—Nonirrigated varieties can be grown wherever the required cultivation can be conducted. Steepness is not a barrier, provided the cultivation costs do not become excessive. Irrigated vineyards require land sufficiently level so that irrigation water can be handled economically and efficiently.

Yields Per Acre (Mature Vineyards)

	<u>Usual</u>	<u>Good</u>	<u>Exceptional</u>
Raisin varieties (dried tons per acre)	1.0 ton	2.0 tons	3.4 tons
Table varieties (irrigated)	8.0 tons	10.0 tons	14.0 tons
Sweet wine varieties (irrigated)	4.0 tons	6.0 tons	9.0 tons
Dry wine varieties			
Coast conditions (nonirrigated)	1.5 tons	3.0 tons	4.0 tons
Interior conditions (nonirrigated)	2.5 tons	4.0 tons	5.0 tons

	<u>Irrigated vineyards</u>	<u>Nonirrigated vineyards</u>
Age to self-sustaining crop	Third season	Fourth season
Age to full production	6-8 yrs.	7-10 yrs.
Estimated productive life	Until 35-40 yrs.	Until 30-35 yrs.

Examples of Cost of Producing Grapes

Examples given below illustrate costs of production based on mature vineyards for:

- (1) Raisins from Thompson seedless grapes; vines set 8' x 12', trellised, irrigated, and drying ratio 4:1.
- (2) Raisins from Muscat grapes; vines set 10' x 12', head pruned, irrigated, drying ratio 3.5:1.
- (3) Table grapes; vines set 10' x 12', trellised, irrigated.
- (4) Sweet wine grapes; vines set 10' x 12', head pruned, irrigated.
- (5) Dry wine grapes; vines set 8' x 8', head pruned, nonirrigated.

INPUTS PER ACRE FOR THOMPSON SEEDLESS RAISIN PRODUCTION

9-Hour Day

Yield 2 Tons of Raisins

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Pruning	20 M/hrs.		20.0	
Wrapping and tying	4 M/hrs.		4.0	
Disking (4 times)	1M 10T 5' double disk	12.0	3.0	3.0
Furrowing (3 times)	1M 10T 4-shovel furrower	25.0	1.1	1.1
Irrigating (3 times)	4 M/hrs.		12.0	
Suckering	3 M/hrs.		3.0	
Cultivating (2 times)	1M 10T 5' double disk	12.0	1.5	1.5
Fertilizing	1M 10T fertilizer attachment	15.0	0.7	0.7
Dusting (4 times)	1M 10T power duster	20.0	1.8	1.8
Distribute trays	2M 10T trailer	3.0	6.0	3.0
Picking	By the tray			
Turning trays (2 times)	2M (2 times)	9.0	4.0	
Stacking trays	2M	6.0	3.0	
Boxing raisins	2M	18.0	1.0	
Hauling from vineyard	2M 10T trailer	4.0	4.4	2.2
Hauling to packer	Contract			
Collecting trays, boxes	2M 10T trailer	4.0	4.4	2.2
Total hours per acre			69.9	15.5

COST PER ACRE FOR THOMPSON SEEDLESS RAISIN PRODUCTION

Labor	Hours	Rate per hour	Cost
General labor	7.4	\$0.85	\$ 6.30
Prune, wrap and tie, sucker	27.0	0.85	22.95
Tractor driver	15.5	1.00	15.50
Irrigating	12.0	0.85	10.20
Turning, stacking, boxing	8.0	0.85	6.80
Total cost of labor			\$61.75
Power Units and Equipment			
Tractor 10 HP wheel	15.5	0.72	11.16
Disk 5' double	4.5	0.17	0.77
Furrower 4-shovel	1.1	0.08	0.09
Fertilizer attachment	0.7	0.08	0.06
Duster	1.8	0.20	0.36
Trailer	7.4	0.05	0.37
Trellises: \$40 to erect, 10 yrs. life			4.00

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COST PER ACRE FOR THOMPSON SEEDLESS RAISIN PRODUCTION

CONTINUED

	Cost
<u>Power Units and Equipment (Cont.)</u>	
Storage shed (per acre): Cost \$20, interest 40¢, depreciation \$1, taxes 40¢, repairs 40¢	\$ 2.20
Raisin boxes, 24: Cost \$24, interest 48¢, depreciation \$1.20, taxes 20¢, repairs \$2	3.88
Drying trays, 727: Cost \$116, interest \$2.32, depreciation \$5.80, taxes \$1, repairs \$2	11.12
Total cost of power units and equipment	\$34.01
<u>Contract and Piece Work</u>	
Picking: 725 trays at 6¢	43.50
Hauling to packing houses: 2 tons at \$2	4.00
Total cost of contract and piece work	\$47.50
<u>Materials</u>	
Ammonium sulphate fertilizer: 300 lbs. at \$53 ton	7.95
Irrigation water: 1.5 acre ft. at \$2	3.00
Twine for tying vines: 3/4 lb. at 80¢	0.60
Sulphur: 50 lbs. at 5¢	2.50
DDT 5-50 dust: 20 lbs. at 11¢	2.20
Total cost of materials	\$16.25
<u>Miscellaneous</u>	
Taxes	7.50
Depreciation of vines: \$100 to establish, 40 yrs. productive life	2.50
Management	13.00
Interest: 4 per cent of \$800	32.00
Compensation insurance: \$1.24 per \$100 payroll	0.65
Total miscellaneous cost	\$55.65
Total cost per acre \$215.16	Cost per pound 5.4¢

 INPUTS PER ACRE FOR MUSCAT RAISIN PRODUCTION
 9-Hour Day Yield 2 Tons of Raisins

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Pruning	15 M/hrs.		15.0	
Disking (2 times)	1M 10T 5' double disk	12.0	3.0	3.0
Furrowing (3 times)	1M 10T 4-shovel furrower	25.0	1.1	1.1
Irrigating (3 times)	4 M/hrs.		12.0	
Suckering	3 M/hrs.		3.0	
Cultivating (2 times)	1M 10T 5' double disk	12.0	1.5	1.5
Fertilizing	1M 10T fertilizer attachment	15.0	0.7	0.7
Sulphuring (4 times)	1M 10T power duster	20.0	1.8	1.8
Distribute trays	2M 10T trailer	3.0	6.0	3.0
Picking	Contract			
Turning trays	5 M/hrs.		5.0	
Rolling	5 M/hrs.		5.0	
Hauling from vineyard	2M 10T trailer	4.0	4.4	2.2
Hauling to packing shed	Contract			
Collecting trays, boxes	2M 10T trailer	4.0	4.4	2.2
Total hours per acre			62.9	15.5

COST PER ACRE FOR MUSCAT RAISIN PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Prune and sucker	18.0	\$0.85	\$15.30
Tractor driver	15.5	1.00	15.50
Irrigating	12.0	0.85	10.20
Turning and rolling trays	10.0	0.85	8.50
Other labor	7.4	0.85	6.28
Total cost of labor			\$55.78
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	15.5	0.72	11.16
Disk 5' double	4.5	0.17	0.77
Furrower 4-shovel	1.1	0.08	0.09
Fertilizer attachment	0.7	0.08	0.06
Duster	1.8	0.20	0.36
Trailer	7.4	0.05	0.37
Boxes			3.00
Total cost of power units and equipment			\$15.81
<u>Contract and Piece Work</u>			
Picking: 725 trays at 6¢			43.50
Hauling to packing shed: 2 tons at \$2			4.00
Total cost of contract and piece work			\$47.50
<u>Materials</u>			
Ammonium sulphate: 300 lbs. at \$53 ton			7.95
Irrigation water: 1.5 acre ft. at \$2			3.00
Sulphur: 50 lbs. at 5¢			2.50
DDT 5-50 dust: 20 lbs. at 11¢			2.20
Paper trays: 727 at \$7 hundred			50.89
Total cost of materials			\$71.13
<u>Miscellaneous</u>			
Taxes			7.50
Depreciation of vines: \$90 to establish, 30 yrs. productive life			3.00
Management			13.00
Interest: 4 per cent of \$800			32.00
Compensation insurance: \$1.24 per \$100 payroll			0.65
Total miscellaneous cost			\$56.15
<hr/>			
Total cost per acre	\$246.37	Cost per pound	6.2¢

 INPUTS PER ACRE FOR TABLE GRAPE PRODUCTION
 9-Hour Day Yield 9 Tons

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Pruning	20 M/hrs.		20.0	
Tying vines	6 M/hrs.		6.0	
Disking (4 times)	1M 10T 5' double disk	12.0	3.0	3.0
Fertilizing	1M 10T fertilizer drill	10.0	0.9	0.9
Furrowing (4 times)	1M 10T 4-shovel furrower	25.0	1.4	1.4
Irrigating (4 times)	3 M/hrs.		12.0	
Cultivating (2 times)	1M 10T 5' double disk	12.0	1.5	1.5
Dusting (4 times)	1M 10T duster	20.0	1.8	1.8
Thinning	8 M/hrs.		8.0	

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INPUTS PER ACRE FOR TABLE GRAPE PRODUCTION

CONTINUED

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Pulling leaves and rolling canes	10 M/hrs.		10.0	
Distribute boxes	2M 10T trailer	4.0	4.4	2.2
Picking	90 M/hrs.		90.0	
Hauling to packer	By ton			
Storing boxes	2M 10T trailer	5.0	3.6	1.8
Total hours per acre			162.6	12.6

COST PER ACRE FOR TABLE GRAPE PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Thin and pull leaves	18.0	\$0.85	\$ 15.30
Tractor driver	12.6	1.00	12.60
Irrigating	15.0	0.85	12.75
Prune and tie vines	26.0	0.85	22.10
Picking	90.0	0.75	67.50
General labor	4.0	0.85	3.40
Total cost of labor			\$133.65
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	12.6	0.72	9.07
Disk 5' double	4.5	0.17	0.77
Fertilizer drill	0.9	0.09	0.08
Furrower 4-shovel	1.8	0.08	0.14
Duster	1.8	0.20	0.36
Trailer	4.0	0.05	0.20
Trellises: \$40 cost, depreciation \$4, interest 80¢			4.80
Picking lugs: 450 at 3¢			13.50
Total cost of power units and equipment			\$ 28.92
<u>Contract and Piece Work</u>			
Hauling to the packing house: 9 tons at \$2			\$ 18.00
<u>Materials</u>			
Twine: 1/2 lb. at 60¢			0.30
Ammonium sulphate: 300 lbs. at \$53 ton			7.95
Irrigation water: 1.5 acre ft. at \$3			4.50
DDT 5-50 dust: 20 lbs. at 11¢			2.20
Sulphur: 50 lbs. at 5¢			2.50
Total cost of materials			\$ 17.45
<u>Miscellaneous</u>			
Taxes			9.00
Depreciation of vines: \$120 to establish, 30 yrs. productive life			4.00
Management			13.00
Interest: 4 per cent of \$800			32.00
Compensation insurance: \$1.24 per \$100 payroll			1.10
Total miscellaneous cost			\$ 59.10
Total cost per acre \$257.12	Cost per pound 1.4¢		

INPUTS PER ACRE FOR SWEET WINE GRAPE PRODUCTION
9-Hour Day Yield 6 Tons

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Pruning	15 M/hrs.		15.0	
Disking (4 times)	1M 10T 5' double disk	12.0	3.0	3.0
Fertilizing	1M 10T fertilizer drill	10.0	0.9	0.9
Furrowing (3 times)	1M 10T 4-row furrower	25.0	1.1	1.1
Irrigating (3 times)	3 M/hrs.		9.0	
Cultivating (2 times)	1M 10T 5' double disk	12.0	1.5	1.5
Suckering	2 M/hrs.		2.0	
Dusting (4 times)	1M 10T duster	20.0	1.8	1.8
Distribute picking boxes	2M 10T trailer	6.0	3.0	1.5
Picking	90 M/hrs.		90.0	
Hauling to winery	By ton			
Storing boxes	2M 10T trailer	7.0	2.6	1.3
Total hours per acre			129.9	11.1

COST PER ACRE FOR SWEET WINE GRAPE PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Pruning and suckering	17.0	\$0.85	\$ 14.45
Tractor driver	11.4	1.00	11.40
Irrigating	9.0	0.85	7.65
Picking*	90.0	0.80	76.50
Other labor	2.8	0.85	2.38
Total cost of labor			\$112.38
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	11.4	0.72	8.21
Disk 5' double	4.5	0.17	0.77
Fertilizer drill	0.9	0.09	0.08
Furrower 4-shovel	1.1	0.08	0.09
Duster	1.8	0.20	0.36
Trailer	2.8	0.05	0.14
Picking lugs: 300 at 3¢			9.00
Total cost of power units and equipment			\$ 18.65
<u>Contract and Piece Work</u>			
Hauling to winery: 6 tons at \$1.50			\$ 9.00
<u>Materials</u>			
Ammonium sulphate: 200 lbs. at \$53 ton			5.30
Irrigation water: 1.5 acre ft. at \$3			4.50
Dusting sulphur: 60 lbs. at 5¢			3.00
DDT 5-50 dust: 20 lbs. at 11¢			2.20
Total cost of materials			\$ 15.00

*Also on a piece work basis:
17¢ per 50-lb. box or \$7.50 to \$8.50 per ton

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COST PER ACRE FOR SWEET WINE GRAPE PRODUCTION

CONTINUED

		Cost
<u>Miscellaneous</u>		
Taxes		\$ 6.00
Depreciation of vines: \$90 to establish, 30 yrs. productive life		3.00
Management charge		13.00
Interest: 4 per cent of \$700		28.00
Compensation insurance: \$1.24 per \$100 payroll		1.10
Total miscellaneous cost		<u>\$51.10</u>
Total cost per acre	\$206.13	Cost per ton \$34.36

 INPUTS PER ACRE FOR DRY WINE GRAPE PRODUCTION
 9-Hour Day Yield 4 Tons

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Pruning	15 M/hrs.		15.0	
Disking (4 times)	1M 10T 5' double disk	12.0	3.0	3.0
Suckering	6 M/hrs.		6.0	
Dusting (3 times)	1M 10T duster	20.0	1.4	1.4
Cultivating (3 times)	1M 10T 5' double disk	12.0	2.2	2.2
Distribute picking boxes	2M 10T trailer	10.0	1.8	0.9
Picking	40 M/hrs.		40.0	
Hauling to winery	By ton			
Storing lugs	2M 10T trailer	12.0	1.6	0.8
Total hours per acre			71.0	8.3

COST PER ACRE FOR DRY WINE GRAPE PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Prune and sucker	21.0	\$0.85	\$17.85
Tractor driver	8.3	1.00	8.30
Other labor	1.7	0.85	1.44
Picking*	40.0	0.80	32.00
Total cost of labor			<u>\$59.59</u>
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	8.3	0.72	5.98
Disk 5' double	4.5	0.17	0.77
Duster	1.4	0.20	0.28
Trailer	1.6	0.05	0.08
Picking lugs: 200 at 3¢			6.00
Total cost of power units and equipment			<u>\$13.11</u>
<u>Contract and Piece Work</u>			
Hauling: 4 tons at \$1.50			\$ 6.00

*Also on a piece work basis: 17¢ per 50-lb. box or \$7.50 to \$8.50 per ton

COST PER ACRE FOR DRY WINE GRAPE PRODUCTION

CONTINUED

	Cost
<u>Materials</u>	
Sulphur: 45 lbs. at 5¢	\$ 2.25
<u>Miscellaneous</u>	
Taxes	5.00
Depreciation of vines: \$60 to establish, 30 yrs. productive life	2.00
Management charge	13.00
Interest: 4 per cent of \$600	24.00
Compensation insurance: \$1.24 per \$100 payroll	0.42
Total miscellaneous cost	\$44.42
Total cost per acre \$125.37	Cost per ton \$31.34

GRAPEFRUIT

Principal Producing Areas

Grapefruit (9,400 acres) is produced principally in the following counties (in order of importance): Riverside, San Bernardino, Imperial, and Los Angeles.

Environmental Requirements

Soil.—Fertile, easily tilled soils, preferably to at least six feet in depth, free from injurious salts (including alkali and boron), well but not excessively drained, and with a fair content of organic matter. Usually, best results are obtained on sandy loams.

Climate.—Since citrus trees are semi-tropical evergreens, freedom from killing frosts (25 degrees or less) is essential at all times. Warm sunny weather free from excessive heat or dryness is needed for the 8 to 9 months of growing season during blossoming and thereafter until the fruit is picked. Freedom from high winds which may whip the trees or loosen unharvested fruit is another essential. Usually 35 degrees of minima and 100 degrees of maxima temperatures mark temperature extremes. Occasional frosts of normal years are offset by use of orchard heaters. In general, grapefruit has a rather wide range of climatic adaptability and does well in a variety of climatic zones, from the intense heat and glare of the Imperial and Coachella valleys to the milder climate of Los Angeles County. Annual amounts of rainfall are unimportant since irrigation is the rule, except as rains may determine the adequacy of the irrigating supply.

Topography.—Topography may vary from level to gently rolling—the two desiderata being good air drainage to insure against frost pockets, and proper providing of irrigation facilities.

Yield Per Acre
(Full Bearing Groves)

Usual	400 boxes
Good	500
Exceptional	900

Yields are reported in number of field boxes of 45 pounds. Three field boxes produce two packed boxes.

Age to Self-Sustaining Crop.—5 to 6 years.

Age to Full Production.—9 to 10 years.

Estimated Productive Life.—Until 40 years of age.

Example of Cost of Producing Grapefruit
(Based on a mature orchard of 90 trees per acre.)

INPUTS PER ACRE FOR GRAPEFRUIT PRODUCTION
9-Hour Day Yield 500 Field Boxes (45 lbs.)

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Furrowing	1M 10T 3-row furrower	20.0	0.4	0.4
Broadcast cover crop	2M 10T broadcaster	40.0	0.4	0.2
Irrigating	4 M/hrs.		4.0	
Pruning, brush disposal	10 M/hrs.		10.0	
Place heaters	1 M/hr.		1.0	
Lighting (3 times)	0.6 M/hrs.		1.8	
Filling pots (3 times)	2M 10T trailer	4.5	12.0	6.0
Storing, cleaning pots	4 M/hrs.		4.0	
Disk (2 times)	1M 10T 6' double disk	10.0	1.8	1.8
Furrow (3 times)	1M 10T 4-shovel furrower	20.0	1.4	1.4
Irrigate (8 times)	4 M/hrs.		32.0	
Cultivate (3 times)	1M 10T 6' double disk	10.0	2.7	2.7
Fertilizing	2M 10T broadcaster	40.0	0.4	0.2
Fumigating	Contract			
Dusting (3 times)	1M 10T duster	40.0	0.6	0.6
Distribute picking equipment	2M 10T trailer	5.0	0.4	0.2
Picking	By the box			
Hauling	By the ton			
Misc. tree care	4 M/hrs.		4.0	
Total hours per acre			76.9	13.5

COST PER ACRE FOR GRAPEFRUIT PRODUCTION

	Hours	Rate per hour	Cost
Labor			
Tractor driver	13.5	\$1.00	\$13.50
Irrigating	36.0	0.85	30.60
Frost protection	12.8	0.85	10.88
Pruning	10.0	0.85	8.50
Other labor	4.6	0.85	3.91
Total cost of labor			\$67.39
Power Units and Equipment			
Tractor 10 HP wheeled	13.5	0.72	9.72
Furrower 3-row	1.8	0.18	0.32
Disk 6' double	4.5	0.11	0.50
Broadcaster	0.4	0.05	0.02
Trailer	6.2	0.05	0.31
Duster	0.6	0.20	0.12
Heaters*			18.00
Total cost of power units and equipment			\$28.99

*\$150 investment, 7 per cent depreciation, 5 per cent interest

COST PER ACRE FOR GRAPEFRUIT PRODUCTION

CONTINUED

	Cost
<u>Contract and Piece Work</u>	
Picking: 500 boxes at 8¢	\$ 40.00
Hauling: 500 boxes at 4¢	20.00
Fumigating: 90 trees at 75¢	67.50
Total cost of contract and piece work	<u>\$127.50</u>
<u>Materials</u>	
Melilotus seed: 20 lbs. at 12¢	2.40
Irrigation water: 3 acre ft. at \$9.50	28.50
Ammonium sulphate fertilizer: 200 lbs. at \$53 ton	5.30
Dusting sulphur: 300 lbs. at 5¢	15.00
Oil for heaters: 750 gal. at 7-1/2¢	56.25
Total cost of materials	<u>\$107.45</u>
<u>Miscellaneous</u>	
Taxes	15.00
Management	13.00
Depreciation of trees: \$600 to establish, 30 yrs. productive life	20.00
Interest: 4 per cent of \$600	24.00
Compensation insurance: \$2.30 per \$100 payroll	1.30
Total miscellaneous cost	<u>\$ 73.30</u>
Total cost per acre \$404.63	Cost per box 81¢

HOPS

Principal Producing Areas

The hop centers of production in California are in the counties of Sacramento, Sonoma, Mendocino, and Yuba.

Environmental Requirements

Soil.—Rich, alluvial sandy loams of outstanding moisture holding capacity at least six feet in depth, free from injurious salts. (Old river bottoms especially favored).

Climate.—Growing season of 6 to 7 months characterized by warm, sunny weather, freedom from frosts and cold spells; freedom from rains during the ripening and picking season; hot dry weather to expedite curing. Preferable limits of temperatures are 60 degrees minima and 100 degrees maxima.

Grown under irrigation so that annual rainfall is not a primary essential only insofar as it affects the quantity and quality of the irrigation supply.

Topography.—Level to permit construction of irrigation facilities and handling of irrigation water.

Yield Per Acre
(Cured Hops)

Usual	1,400 lbs.
Good	2,000 lbs.
Exceptional	3,000 lbs.

Note: Pressed into bales weighing 200 pounds gross or 180 pounds net.

Drying Ratio.—3.5 pounds of fresh hops produce one pound of dried hops.

Age to Self-Sustaining Crop.—Second or third season.

Age to Full Production.—4 to 5 years.

Estimated Productive Life.—Until 30 to 40 years of age.

Example of Cost of Producing Hops

Based on a high-pole system hop-yard producing 2,000 pounds of dried hops per acre. Plants set 8 x 8 feet (700 per acre).

INPUTS PER ACRE FOR HOP PRODUCTION

9-Hour Day Yield 2,000 Pounds (Cured)

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Disking (2 times)	1M 20T 5' double disk	10.0	1.8	1.8
Manuring	2M 20T manure spreader	6.0	3.0	1.5
Checking	1M 20T disk ridger	20.0	0.4	0.4
Irrigating	9 M/hrs.		9.0	
Broadcast cover crop	1M hand broadcaster	12.0	0.8	
Plow each side of row both ways	1M 20T 2-14" plow	3.0	3.0	3.0
Disk (2 times)	1M 20T 5' double disk	10.0	1.8	1.8
Cultivating (12 times)	1M 20T land cultivator	12.0	7.2	7.2
Checking (2 times)	1M 20T disk ridger	20.0	0.9	0.9
Irrigating (2 times)	15 M/hrs. per time		30.0	
Disking (2 times)	1M 20T 5' double disk	10.0	1.8	1.8
Plow to vines	1M 20T 2-way plow	6.0	1.5	1.5
Fertilizing	3M 20T sled	20.0	1.2	0.4
Tying, pegging, grubbing, training, pruning, suckering	70 M/hrs.		70.0	
Dusting	Contract applied			
Harvesting	6 M 20T mechanical harvester	10.0	5.4	0.9
Field boss	1M/hr.		1.0	
Hauling to kiln (20 tr. mi.) and weighing	3M 1-1/2 tr.	10.0	2.7	
Drying	8M (5 kiln helpers, 1 drier, 2 firemen)	4.0	288.0	
Bookkeeping	3.4 M/hrs.		3.4	
Baling	10 M/hrs.		10.0	
Hauling to warehouse	Contract			
Total truck miles	20.0	Total hours per acre	442.9	21.2

COST PER ACRE FOR HOP PRODUCTION

Labor	Hours	Rate per hour	Cost
Labor camp charge			\$ 7.50
Field boss	1.0	\$1.00	1.00
Tractor driver and truck driver	22.1	0.85	18.80
General labor	4.9	0.85	4.16
Irrigating	39.0	0.85	33.15
Tying, pegging, grubbing, training, pruning and suckering	70.0	0.85	59.50

COST PER ACRE FOR HOP PRODUCTION

CONTINUED

	Hours	Rate per hour	Cost
<u>Labor (Cont.)</u>			
Harvesters	4.5	\$0.85	\$ 3.82
Kiln helpers	288.0	0.85	244.80
Bookkeeper	3.4	1.00	3.40
Baling	10.0	0.85	8.50
Total cost of labor			\$384.63
<u>Power Units and Equipment</u>			
Tractor 20 HP track	21.2	1.48	31.38
Truck (20.0 miles at 12.1¢)			2.42
Disk 5' double	5.4	0.17	0.92
Manure spreader	1.5	0.12	0.18
Disk ridger	1.3	0.08	0.10
Hand broadcaster			0.02
2-14" plow, and 2-way plow	4.5	0.15	0.68
Trellises: cost \$110; life 20 yrs.			5.50
Cooler			7.66
Baler			0.62
Picking machine: 72¢ per 100 lbs. green weight			50.40
Sled	0.4	0.05	0.02
Kilns			13.70
Hand cultivator	7.2	0.08	0.58
Total cost of power units and equipment			\$114.18
<u>Contract and Piece Work</u>			
Dusting			1.00
Hauling to warehouse: 10 bales at 35¢			3.50
Total cost of contract and piece work			\$ 4.50
<u>Materials</u>			
Manure: 5 tons at \$3			15.00
Irrigation water: 1-1/2 acre ft. at \$2.50			3.75
Melilotus indica seed: 20 lbs. at 12¢			2.40
Pacific guano fertilizer: 650 lbs. at \$56 ton			17.20
String—for stringing: 42 lbs. at 50¢			21.00
Dusting sulphur: 30 lbs. at 6¢			1.80
Sacks: 3 at 10¢			0.30
Oil: 120 gal. at 7¢			8.40
Sulphur: 13 lbs. at 5¢			0.65
Electricity: at 32¢ per bale			3.20
Kiln cloths: 3 at \$32 for 80 acres			1.20
Baling cloth: 52.5 yards at 35¢			18.38
Twine for baline: 1 lb. at \$1.50			1.50
Storage*			0.48
Total cost of materials			\$ 95.26
<u>Miscellaneous</u>			
Management: \$350 per month for 200 acres			21.00
Insurance on crop: 75¢ per \$100 (2,000 lbs. at 62¢)			9.30
On hops in kiln: Average \$10,000 at \$1.93 per \$100 for 80 acres			2.41
On hops in cooler: Average \$43,400 at \$1.93 per \$100 for 80 acres			10.47
Liability insurance: \$1.77 per \$100 payroll			5.31
Taxes on hop yard: Land \$325, trellis \$55 at \$3.65 per 100			10.51
Interest on investment: 4 per cent of \$600			24.00
Interest on operating capital: \$400 for six months at 5 per cent			10.00
Total miscellaneous cost			\$ 93.00
Total cost per acre \$691.57	Cost per pound 34.6¢		

*20 per cent of crop. 10¢ per bale for 1 month, 7¢ per bale for 2 months.

COST OF SPECIAL EQUIPMENT FOR HOP PRODUCTION

	Cost
<u>Kilns: 3 at \$3,500 for 80 acres.</u>	
Annual cost per kiln	
Depreciation: \$3,500 for 25 years	\$ 140.00
Interest: 4 per cent of \$1,750	56.00
Repairs: 2 per cent of \$3,500	70.00
Taxes: \$2.50 per \$100 average value	43.75
Insurance: \$1.93 per \$100 average value	33.75
Drying permit: \$1.25 per \$100	21.90
Total cost per kiln	\$ 365.40
For 3 kilns	1,096.20
Per acre	13.70
<u>Cooler for 80 acres</u>	
Depreciation: \$6000 for 25 years	\$ 240.00
Interest: 4 per cent of \$3,000	120.00
Repairs: 2 per cent of \$6,000	120.00
Taxes: \$2.50 per \$100 on \$3,000	75.00
Insurance: \$1.93 per \$100 on \$3,000	57.90
Total cost for cooler	\$ 612.90
Per acre	7.66
<u>Baler for 80 acres</u>	
Depreciation: \$700 for 25 years	\$ 28.00
Repairs	20.00
Taxes	2.00
Total cost for baler	\$ 50.00
Per acre	0.62

LEMONS

Principal Producing Areas

Lemons are produced principally in the following counties (in order of importance): Ventura, Los Angeles, Santa Barbara, San Diego, and San Bernardino.

Environmental Requirements

Soil.—Fertile, easily tilled soils, preferably to at least six feet in depth, free from injurious salts (including alkali and boron) well but not excessively drained, and with a fair content of organic matter. Usually best results are obtained on clay loams.

Climate.—Since citrus trees are semi-tropical evergreens, freedom from killing frosts (29 degrees or less) is essential at all times. Warm, sunny weather free from excessive heat or dryness is needed for the 8 to 9 months of growing season during blossoming and thereafter until the fruit is picked. Freedom from high winds which may whip the trees or loosen unharvested fruit is another essential. Usually 35 degrees of minima and 100 degrees of maxima temperatures mark temperature extremes. Occasional frosts of normal years are offset by use of orchard heaters or wind machines. Lemons favor the coast area of southern California where the climate is fairly equitable and free from

intense heat. Annual amounts of rainfall are unimportant since irrigation is the rule, except as rains may determine the adequacy of the irrigating supply or assist in causing Fall and early Winter lemons to "size" properly.

Topography.—Topography may vary from level to gently rolling—the two desiderata being good air drainage to insure against frost pockets, and proper providing of irrigation facilities.

Yield Per Acre
(Full Bearing Groves)

Usual	600 boxes
Good	750 boxes
Exceptional	1,000 boxes

Yields are reported in numbers of field boxes of 78 pounds. Two and one fourth field boxes of lemons produce two packed boxes.

Age to Self-Sustaining Crop.—6 to 7 years.

Age to Full Production.—10 to 12 years.

Estimated Productive Life.—Until 40 years of age.

Example of Cost of Producing Lemons
(Based on a mature orchard of 90 trees.)

INPUTS PER ACRE FOR LEMON PRODUCTION
9-Hour Day Yield 450 90-lb. Field Boxes

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Furrowing	1M 10T 3-row furrower	20.0	0.4	0.4
Broadcast cover crop	2M 10T broadcaster	40.0	0.4	0.2
Irrigating	3 M/hrs.		3.0	
Pruning and brush removal	30 M/hrs.		30.0	
Place heaters	1 M/hr.		1.0	
Lighting* (3 times)	0.6 M/hrs.		1.8	
Filling pots* (3 times)	2M 10T trailer	4.5	12.0	6.0
Storing, cleaning pots	4 M/hrs.		4.0	
Disking (5 times)	1M 10T 6' double disk	10.0	4.5	4.5
Furrowing (3 times)	1M 10T 3-row furrower	20.0	1.4	1.4
Irrigating (6 times)	3 M/hrs.		18.0	
Fertilizing	2M 10T broadcaster	40.0	0.4	0.2
Dusting (3 times)	1M 10T duster	40.0	0.6	0.6
Misc. tree care	4 M/hrs.		4.0	
Distribute picking equipment	2M 10T trailer	5.0	0.4	0.2
Picking	By the box			
Hauling	By the box			
Total hours per acre			81.9	13.5

*Very variable—examples only

COST PER ACRE FOR LEMON PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	13.5	\$1.00	\$ 13.50
Irrigation	21.0	0.85	17.85
Frost protection	12.8	0.85	10.88
Pruning	30.0	0.85	25.50
Other labor	4.6	0.85	3.91
Total cost of labor			\$ 71.64
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	13.5	0.72	9.72
Furrower 3-row	1.8	0.18	0.32
Disk 6' double	4.5	0.11	0.50
Broadcaster	0.4	0.05	0.02
Heaters: \$150 investment, 7 per cent depreciation, 5 per cent interest			18.00
Trailer	6.2	0.05	0.31
Duster	0.6	0.20	0.12
Total cost of power units and equipment			\$ 28.99
<u>Contract and Piece Work</u>			
Picking: 450 boxes at 50¢			225.00
Hauling: 450 boxes at 6¢			27.00
Fumigating: 90 trees at 75¢			67.50
Total cost of contract and piece work			\$319.50
<u>Materials</u>			
Melilotus seed: 20 lbs. at 12¢			2.40
Irrigation water: 2 acre ft. at \$9.50			19.00
Ammonium sulphate fertilizer: 200 lbs. at \$53 ton			5.30
Dusting sulphur: 300 lbs. at 5¢			15.00
Oil for heater: 750 gal. at 7-1/2¢			56.25
Total cost of materials			\$ 97.95
<u>Miscellaneous</u>			
Taxes			15.00
Management			26.00
Depreciation of trees: \$900 to establish, 30 yrs. productive life			30.00
Interest: 4 per cent of \$2,000			80.00
Compensation insurance: \$2.30 per \$100 payroll			5.75
Total miscellaneous cost			\$156.75
Total cost per acre \$674.83	Cost per 90-lb. box \$1.50		

LETTUCE

Principal Producing Areas

Counties with major acreages in order of importance are:

Winter Lettuce.—Imperial, Riverside.

Spring, Summer, and Fall Lettuce.—Monterey, Santa Barbara, Santa Cruz.

Environmental Requirements

Soil.—Rich fine sandy loam or loam soil, at least three feet in depth, of excellent moisture-holding capacity but well drained, free from alkali or other injurious salts.

Climate.—Moderately cool, temperate climatic conditions, of fairly high humidity; free from frosts, hot spells, and sudden temperature changes from day to night. Minima and maxima temperatures of 40 and 70 degrees respectively are best. If raised as a nonirrigated crop 12 inches of rainfall available to the crop is needed. If irrigated, rainfall is not a factor except as it affects the irrigating supply. Freedom from rains during ripening and harvesting is essential.

Topography.—Level to gently rolling if grown as a nonirrigated crop. Level land to facilitate irrigation if grown under irrigation.

Yield Per Acre

(Packed crates, 4-6 dozen heads per crate)

Usual	175 crates
Good	250 crates
Exceptional	350 crates

Example of Cost of Producing Lettuce

Lettuce is ordinarily raised in rotation with other crops and frequently it constitutes one of two or more crops raised annually—thus classifying as one crop of a multiple cropping program. To maintain fertility green manure crops are commonly made a part of the cropping program. A sample rotation is: First year, spring carrots followed by fall lettuce, followed by a green manure crop; second year, beans; third year, carrots and lettuce. Lettuce is usually sold in the field so that costs are shown only up until harvest time.

INPUTS PER ACRE FOR FALL LETTUCE PRODUCTION

9-Hour Day

Yield 200 Crates

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 20T 2-14" plow	6.0	1.5	1.5
Disk and harrow (2 times)	1M 20T 10' double disk, 10' spike harrow	27.0	0.7	0.7
Making beds	1M 20T 3-row lister	8.0	1.1	1.1
Irrigation	3 M/hrs.		3.0	
Planting	1M 20T 6-row planter	15.0	0.6	0.6
Thinning	22.5 M/hrs.		22.5	
Weeding	10 M/hrs.		10.0	
Fertilizing	1M 10T 4-row cultivator, fertilizer attachment	12.0	0.8	0.8
Irrigating (3 times)	3 M/hrs.		9.0	
Cultivating (3 times)	1M 10T 4-row cultivator	15.0	1.8	1.8
Dusting	1M 10T 4-row duster	15.0	0.6	0.6
Poisoning cutworm	1M 10T fertilizer attachment	20.0	0.4	0.4
Total hours per acre			52.0	7.5

COST PER ACRE FOR FALL LETTUCE PRODUCTION

<u>Labor</u>	Hours	Rate per hour	Cost
Tractor driver	7.5	\$1.00	\$ 7.50
Irrigating	12.0	0.75	9.00
Thinning and weeding	32.5	0.75	24.38
Total cost of labor			<u>\$40.88</u>
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	3.9	0.72	2.81
Tractor 20 HP track	3.6	1.48	5.33
Duster 4-row	0.6	0.20	0.12
Plow 2-14"	1.5	0.15	0.22
Disk 10' double	0.7	0.27	0.19
Harrow 10' spike	0.7	0.02	0.01
Lister, 3-row	1.1	0.39	0.43
Planter 6-row	0.6	0.11	0.07
Cultivator 4-row	2.6	0.18	0.47
Fertilizer attachment	1.2	0.08	0.10
Total cost of power units and equipment			<u>\$ 9.75</u>
<u>Materials</u>			
Manure: 1/2 of 6 tons at \$5			15.00
Seed: 1.5 lbs. at \$1.25			1.68
Irrigation water: 1.5 acre ft. at \$3			4.50
Ammonium sulphate: 200 lbs. at \$53 ton			5.30
Calcium arsenate: 25 lbs. at 10¢			2.50
Poison bran: 20 lbs. at 10¢			2.00
Total cost of materials			<u>\$36.28</u>
<u>Miscellaneous</u> (Double cropped so charge half to each crop)			
Taxes: 1/2 of \$4			2.00
Management: 1/2 of \$24			12.00
Interest: 1/2 of 4 per cent of \$1,000			20.00
Compensation insurance: \$2.45 per \$100 payroll			0.31
Total miscellaneous cost			<u>\$34.31</u>
Total cost per acre \$121.22	Cost per field crate* 61¢		

*If wet pack add \$2.29 per 4-6 doz. crates of 80 lbs. net. (Of this \$2.29 cost of crates, lids, and paper is 72¢.)

OATS

Principal Producing Areas

Oats are grown generally throughout the state but the counties of major production in order of importance are: Riverside, San Joaquin, Sacramento, Solano, Stanislaus, Tehama, Placer, Santa Barbara, San Mateo, and Merced.

Environmental Requirements

Oats have relatively wide acceptable environmental conditions, as already indicated by their wide distribution throughout California under a variety of soil, climatic, and topographical features. The more desirable soils are fertile silt loams or lighter soil 2 or more feet in depth, not subject to standing water

during the rainy season, well supplied with organic matter, and free from injurious salts. Best results require a somewhat cool humid climate. Moisture requirements are from 12-16".

**Yields Per Acre
(Threshed Grain)**

	<u>Dry-farmed</u>	<u>Irrigated</u>
Usual	700 lbs.	1,000 lbs.
Good	1,000 lbs.	1,500 lbs.
Exceptional	1,500 lbs.	2,500 lbs.

Example of Cost of Producing Oats

Examples are shown for (a) nonirrigated, and (b) irrigated conditions.

INPUTS PER ACRE FOR DRY FARMED OAT PRODUCTION
9-Hour Day Yield 1,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 20T 4-14" plow	12.0	0.8	0.8
Disking (2 times)	1M 20T 20' single disk	45.0	0.4	0.4
Harrowing (2 times)	1M 20T 20' spike harrow	45.0	0.4	0.4
Seeding	2M 20T 2-10' drills	35.0	0.6	0.3
Harvesting	4M 20T 12' combine	15.0	2.4	0.6
Hauling	Contract			
Total hours per acre			4.6	2.5

COST PER ACRE FOR DRY FARMED OAT PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	2.5	\$1.00	\$ 2.50
Seeding	0.3	1.00	0.30
Harvesting	1.8	1.00	1.80
Total cost of labor			\$ 4.60
<u>Power Units and Equipment</u>			
Tractor 20 HP track	2.5	1.48	3.70
Plow 4-14"	0.8	0.27	0.22
Disk 20' single	0.4	0.30	0.12
Harrow 20' spike	0.4	0.04	0.02
Drill 10'	0.6	0.31	0.19
Combine 12'	0.6	1.15	0.69
Total cost of power units and equipment			\$ 4.94
<u>Contract and Piece Work</u>			
Hauling from field to warehouse: 1,000 lbs. at \$2 ton			1.00
Storage—3 months at 75¢ a ton first month, 25¢ a ton thereafter: 1,000 lbs. at \$1.25 ton			0.63
Total cost of contract and piece work			\$ 1.63

CONTINUED ON NEXT PAGE

COST PER ACRE FOR DRY FARMED OAT PRODUCTION

CONTINUED

	Cost
<u>Materials</u>	
Seed: 70 lbs. at \$2.28 cwt.	\$ 1.60
Sacks and twine: 10 at 20¢	2.00
Total cost of materials	\$ 3.60
<u>Miscellaneous</u>	
Taxes	3.00
Management	5.25
Insurance: \$1.50 per \$100 per season insured at \$45 a ton	0.34
Interest: 4 per cent of \$200	8.00
Compensation insurance: \$4.20 per \$100 payroll	0.10
Total miscellaneous cost	\$16.69
Total cost per acre \$31.46	Cost per cwt. \$3.15

INPUTS PER ACRE FOR IRRIGATED OAT PRODUCTION

9-Hour Day

Yield 1,500 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Establish borders	1M 20T disk ridger	60.0	0.2	0.2
Irrigating	2 M/hrs.		2.0	
Plowing	1M 20T 4-14" plow	12.0	0.8	0.8
Disking (2 times)	1M 20T 20' single disk	45.0	0.4	0.4
Harrowing (2 times)	1M 20T 20' spike harrow	45.0	0.4	0.4
Seeding	2M 20T 2-10' drills	35.0	0.6	0.3
Harvesting	4M 20T 12' combine	15.0	2.4	0.6
Hauling	Contract			
Total hours per acre			6.8	2.7

COST PER ACRE FOR IRRIGATED OAT PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	2.7	\$1.00	\$2.70
Irrigating	2.0	1.00	2.00
Seeding	0.3	1.00	0.30
Harvesting	1.8	1.00	1.80
Total cost of labor			\$6.80
<u>Power Units and Equipment</u>			
Tractor 20 HP track	2.7	1.48	4.00
Disk ridger	0.2	0.08	0.02
Plow 4-14"	0.8	0.27	0.22
Disk 20' single	0.4	0.30	0.12
Harrow 20' spike	0.4	0.04	0.02
Drill 10'	0.6	0.31	0.19
Combine 12'	0.6	1.15	0.69
Total cost of power units and equipment			\$5.26

COST PER ACRE FOR IRRIGATED OAT PRODUCTION

CONTINUED

	Cost
<u>Contract and Piece Work</u>	
Hauling from field to warehouse: 1,500 lbs. at \$2 ton	\$ 1.50
Storage—3 months at 75¢ a ton first month, 25¢ thereafter: 1,500 lbs. at \$1.25 ton	0.94
Total cost of contract and piece work	\$ 2.44
<u>Materials</u>	
Irrigation water: 0.5 acre ft. at \$2	1.00
Seed: 80 lbs. at \$2.28 cwt.	1.82
Sacks and twine: 15 at 20¢	3.00
Total cost of materials	\$ 5.82
<u>Miscellaneous</u>	
Taxes	0.75
Management: 1/2 of \$15	7.50
Insurance: \$1.50 per \$100 per season, insured at \$45 a ton	0.51
Interest: 1/2 of 4 per cent of \$300	6.00
Compensation insurance: \$2.45 per \$100 payroll	0.15
Total miscellaneous cost	\$14.91
Total cost per acre \$35.23	less \$1 return from pasturage
Net cost per acre \$34.23	Cost per cwt. \$2.28

OLIVES

Principal Producing Areas

Of about 27,000 acres in olive trees, counties of outstanding acreages in order of importance are: Tulare, Butte, Tehama, and Sacramento

Environmental Requirements

Soil.—Warm, soft, friable, sandy loam, six feet or more in depth, moderately moist, well drained, no intervening layers of hardpan or heavy clay; abundance of lime and potash; free from injurious salts.

Climate.—A mild year-round climate, since the tree is an evergreen and subject to winter killing if the weather drops much below freezing during the winter months; hot dry weather during blossoming, fruiting and ripening (8 to 9 months); warm nights. During the growing season limits of minima and maxima temperatures are about 60 and 110 degrees respectively.

Topography.—Since irrigation is usually required in areas suited to olive growing the land must be sufficiently level to permit efficient and economical handling of irrigation water.

Yield Per Acre
(Mature Producing Groves)

Usual	1.5 tons
Good	2.5 tons
Exceptional	4.0 tons

Age to Self-Sustaining Crop.—5 to 7 years.

Age to Full Production.—10 to 12 years.

Estimated Productive Life.—Not definitely known, perhaps until 50 to 60 years of age.

Example of Cost of Producing Olives

The data apply to a mature orchard of 33 trees per acre, planted on level land, and irrigated from a farm-owned irrigating plant. Planting distances vary from 36' for Mission and Manzanillo varieties to 25' for the Sevillano.

INPUTS PER ACRE FOR THE PRODUCTION OF OLIVES FOR OIL
9-Hour Day Yield 2.5 Tons*

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Broadcast cover crop	2M 20T broadcaster	40.0	0.4	0.2
Pruning	18 M/hrs.		18.0	
Harrow	1M 20T 20' harrow	40.0	0.2	0.2
Removing brush	2M 20T sled	6.0	0.4	0.2
Disking (2 times)	1M 20T 8' double disk	20.0	0.9	0.9
Fertilizing	2M 20T broadcaster	40.0	0.4	0.2
Furrowing (3 times)	1M 20T 3-row furrower	30.0	0.9	0.9
Irrigating (5 times)	4 M/hrs.		20.0	
Cultivating (3 times)	1M 20T 8' double disk	20.0	1.4	1.4
Spray	3M 20T 400-gal. sprayer	3.0	9.0	3.0
Picking	125 M/hrs.		125.0	
Hauling (30 tr. mi.)	1M 1-1/2 tr.	3.0	3.0	
Total truck miles 30.0	Total hours per acre		179.6	7.0

*40 to 50 gallons of 16 per cent oil per ton

COST PER ACRE FOR THE PRODUCTION OF OLIVES FOR OIL

	Hours	Rate per hour	Cost
<u>Labor</u>			
Spraying	6.0	\$0.85	\$ 5.10
Pruning	18.0	0.85	15.30
Tractor and truck driver	10.0	1.00	10.00
Irrigating	20.0	0.85	17.00
Picking**	125.0	0.85	106.25
Other labor	0.6	0.85	0.51
Total cost of labor			\$154.16
<u>Power Units and Equipment</u>			
Tractor 20 HP track	7.0	1.48	10.36
Truck (30 miles at 12.1¢)			3.63
Sled	0.2	0.02	0.01
Disk 8' double	2.3	0.15	0.35
Harrow 18' spike	0.2	0.04	0.02
Furrower 2-row	0.9	0.23	0.21
Sprayer 400 gallon	3.0	0.83	2.49
Pruning equipment	18.0	0.01	0.18
Lug boxes, rent 100 at 2¢			2.00
Broadcaster	0.4	0.05	0.02
Total cost of power units and equipment			\$ 19.27

**Or contracted at \$55 per ton.

COST PER ACRE FOR THE PRODUCTION OF OLIVES FOR OIL

CONTINUED

	Cost
<u>Materials</u>	
Irrigation water: 3-1/3 acre ft. at \$4	\$13.33
Ammonium sulphate: 400 lbs. at \$53 ton	10.60
Mustard seed: 5 lbs. at 12¢	0.60
Light summer oil for 1,150 gal. 2 per cent spray: 23 gal. at 40¢	9.20
Total cost of materials	\$33.73
<u>Miscellaneous</u>	
Taxes	8.00
Management	26.00
Depreciation of trees: \$600 to establish, 60 yrs. productive life	10.00
Interest: 4 per cent of \$850	34.00
Compensation insurance: \$2.30 per \$100 payroll	2.60
Total miscellaneous cost	\$80.60
Total cost per acre \$287.76	Cost per ton \$115.10

Canning olives: Cost of picking \$90 per ton

ONIONS

Principal Producing Areas

Major producing counties in order of importance are:

<u>Spring onions</u>	<u>Late summer onions</u>
San Joaquin	Monterey
Kern	Yolo
Imperial	Kern
	San Benito
	Los Angeles
	San Joaquin

Environmental Requirements

Soil.—Loam or silt loam, at least 4 feet in depth, well drained, well supplied with organic matter but not too rich since it forces top growth rather than bulb development; free from serious weeds, alkali or other injurious salts.

Climate.—Moderate temperatures during a growing season of 4 to 5 months, free from hot spells or sudden drop in temperature; minima and maxima extremes should not exceed 40 and 70 degrees respectively. If grown under non-irrigated conditions, 10 to 12 inches of available rainfall is needed.

Topography.—Usually planted on level land, especially if grown under irrigated conditions.

Yield Per Acre

Usual	15,000 lbs.
Good	25,000 lbs.
Exceptional	35,000 lbs.

Example of Cost of Producing Onions

Based on a late summer crop, seeded directly in the field under double cropped conditions.

INPUTS PER ACRE FOR ONION PRODUCTION

9-Hour Day

Yield 25,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 20T 3-14" plow	6.0	0.2	0.2
Disking (2 times)	1M 20T 10' double disk	20.0	0.9	0.9
Harrowing (2 times)	1M 20T 20' spike harrow	40.0	0.4	0.4
Dragging (2 times)	1M 20T 12' drag	18.0	1.0	1.0
Planting	1M 10T 4-row seeder	12.0	0.8	0.8
Irrigating (6 times)	3.0 M/hrs.		18.0	
Weeding (2 times)	27 M/hrs.		54.0	
Hoeing (2 times)	27 M/hrs.		54.0	
Cultivating (3 times)	1M 10T 2-row cultivator	16.0	1.7	1.7
Fertilize	1M 10T 2-row cultivator, fertilizer attachment	16.0	0.6	0.6
Lifting	1M 10T 4-row cutter	12.0	0.8	0.8
Pulling, piling, topping, sorting, sacking	200 M/hrs.		200.0	
Hauling	Contract			
Total hours per acre			332.4	6.4

COST PER ACRE FOR ONION PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	6.4	\$1.00	\$ 6.40
Irrigating	18.0	0.75	13.50
Weeding and hoeing	108.0	0.75	81.00
Harvesting	200.0	0.75	150.00
Total cost of labor			\$250.90
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	3.9	0.72	2.81
Tractor 20 HP track	2.5	1.48	3.70
Fertilizer attachment	0.6	0.08	0.05
Plow 3-14"	0.2	0.17	0.03
Disk 10' double	0.9	0.27	0.24
Planter 4-row	0.8	0.19	0.15
Cultivator 2-row	2.3	0.10	0.23
Spike harrow 20'	0.4	0.04	0.02
Drag 12'	1.0	0.01	0.01
Onion cutter 4-row	0.8	0.02	0.02
Total cost of power units and equipment			\$ 7.26
<u>Contract and Piece Work</u>			
Hauling: 12.5 tons at \$2			\$ 25.00
<u>Materials</u>			
Seed: 4 lbs. at \$3			12.00
Irrigation water: 2.5 acre ft. at \$3			7.50
Ammonium sulphate: 400 lbs. at \$53 ton			10.60
Sacks and twine: 500 at 20¢			100.00
Total cost of materials			\$130.10

COST PER ACRE FOR ONION PRODUCTION

CONTINUED

	Cost
Miscellaneous (double cropped)	
Taxes: 1/2 of \$10	\$ 5.00
Management: 1/2 of \$24	12.00
Interest: 1/2 of 4 per cent of \$500	10.00
Storing: 3 months at \$1.50 a ton	18.75
Compensation insurance: \$1.24 per \$100 payroll	2.46
Total miscellaneous cost	\$48.21
Total cost per acre \$461.47	Cost per 50-lb. sack 92¢

ORANGES

Principal Producing Areas

Navel oranges are produced principally in the counties of San Bernardino, Tulare, Los Angeles, and Riverside. Other counties reporting from 1,000 to 2,000 acres are: Fresno, Ventura, Kern, and Butte.

Valencia oranges are produced principally in the counties of Orange, Los Angeles, Ventura, San Bernardino, and Tulare.

Other oranges are produced in small amounts but the acreage is not enough to be significant.

Environmental Requirements

Soil.—Fertile, easily tilled soils, preferably to at least six feet in depth, free from injurious salts (including alkali and boron), well but not excessively drained, and with a fair content of organic matter. Usually, best results are obtained on either sandy loams or clay loams.

Climate.—Since citrus trees are semi-tropical evergreens, freedom from killing frosts (25 degrees or less) is essential at all times. Warm, sunny weather free from excessive heat or dryness is needed for the 8 to 9 months of growing season during blossoming and thereafter until the fruit is picked. Freedom from high winds which may whip the trees or loosen unharvested fruit is another essential. Usually 35 degrees of minima and 100 degrees of maxima temperatures mark temperature extremes. Occasional frosts of normal years are offset by use of orchard heaters and/or wind machines. The Navel oranges favor a location where summers are hot and fairly dry, with bright days, and fairly warm nights; thus this citrus fruit is grown in the interior valleys of the southern California fruit belt in the San Joaquin and Sacramento valleys. The Valencia orange favors the equitable and somewhat humid coastal region of southern California. Annual amounts of rainfall are unimportant since irrigation is the rule, except as rains may determine the adequacy of the irrigating supply.

Topography.—Topography may vary from level to gently rolling—the two desiderata being good air drainage to insure against frost pockets, and proper providing of irrigation facilities.

Yields Per Acre
(Full Bearing Groves)

	Navel oranges	Valencia oranges
Usual	300 boxes	350 boxes
Good	450	500
Exceptional	750	800

Yields are reported in numbers of field boxes of 72 pounds per acre. As a rule, 3 field boxes produce two packed boxes (varying, however, with size and quality).

Age to Self-Sustaining Crop.—6 to 7 years.

Age to Full Production.—10 to 12 years.

Estimated Productive Life.—Until 40 years of age.

Examples of Cost of Producing Oranges

Examples are shown for (1) Navel oranges, and (2) Valencia oranges based on mature orchards of 90 trees per acre.

INPUTS PER ACRE FOR NAVEL ORANGE PRODUCTION 9-Hour Day Yield 350 50-lb. Boxes

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Furrowing	1M 10T 3-row furrower	20.0	0.4	0.4
Broadcast cover crop	2M 10T broadcaster	40.0	0.4	0.2
Irrigating	3 M/hrs.		3.0	
Prune, remove brush	10 M/hrs.		10.0	
Place heaters	1 M/hr.		1.0	
Lighting* (3 times)	0.6 M/hrs.		1.8	
Filling pots* (3 times)	2M 10T trailer	4.5	12.0	6.0
Storing, cleaning pots	4 M/hrs.		4.0	
Disking (2 times)	1M 10T 6' double disk	10.0	1.8	1.8
Cultivating (3 times)	1M 10T 6' double disk	10.0	2.7	2.7
Furrowing (3 times)	1M 10T 3-row furrower	20.0	1.4	1.4
Irrigating (6 times)	3 M/hrs.		18.0	
Fertilizing	2M 10T broadcaster	40.0	0.4	0.2
Sulphuring (3 times)	1M 10T duster	40.0	0.6	0.6
Misc. tree care	4 M/hrs.		4.0	
Distribute picking equipment	2M 10T trailer	5.0	0.4	0.2
Picking, hauling	By the box			
Total hours per acre			61.9	13.5

*Very variable—examples only.

COST PER ACRE FOR NAVEL ORANGE PRODUCTION

	Hours	Rate per hour	Cost
Labor			
Tractor driver	13.5	\$1.00	\$13.50
Irrigating	21.0	0.85	17.85
Frost protection	12.8	0.85	10.75
Pruning	10.0	0.85	8.50
Other labor	4.6	0.85	3.91
Total cost of labor			\$54.51
Power Units and Equipment			
Tractor 10 HP wheeled	13.5	0.72	9.72
Furrower 3-row	1.8	0.18	0.32
Disk 6' double	4.5	0.11	0.50
Broadcaster	0.4	0.05	0.02
Heaters**			18.00
Trailer	6.2	0.05	0.31
Duster	0.6	0.20	0.12
Total cost of power units and equipment			\$28.99

**\$150 investment, 7 per cent depreciation, 5 per cent interest

COST PER ACRE FOR NAVEL ORANGE PRODUCTION

CONTINUED

	Cost
<u>Contract and Piece Work</u>	
Picking: 350 boxes at 15¢	\$ 52.50
Hauling: 350 boxes at 6¢	21.00
Fumigating: 90 trees at 75¢	67.50
Total cost of contract and piece work	<u>\$141.00</u>
<u>Materials</u>	
Melilotus seed: 20 lbs. at 12¢	2.40
Irrigation water: 2.5 acre ft. at \$9.50	23.75
Ammonium sulphate fertilizer: 200 lbs. at \$53 ton	5.30
Dusting sulphur: 300 lbs. at 5¢	15.00
Oil for heaters: 750 gal. at 7-1/2¢	56.25
Total cost of materials	<u>\$102.70</u>
<u>Miscellaneous</u>	
Taxes	15.00
Management	26.00
Depreciation of trees: \$900 to establish, 30 yrs. productive life	30.00
Interest: 4 per cent of \$900	36.00
Compensation insurance: \$2.30 per \$100 payroll	1.50
Total miscellaneous cost	<u>\$108.50</u>
Total cost per acre \$435.70	Cost per 50-lb. field box \$1.24

INPUTS PER ACRE FOR VALENCIA ORANGE PRODUCTION

9-Hour Day

Yield 400 50-lb. Boxes

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Furrowing	1M 10T 3-row furrower	20.0	0.4	0.4
Broadcast cover crop	2M 10T broadcaster	40.0	0.4	0.2
Irrigating	3 M/hrs.		3.0	
Prune, remove brush	10 M/hrs.		10.0	
Place heaters	1 M/hr.		1.0	
Lighting (3 times)	0.6 M/hrs.		1.8	
Filling pots (3 times)	2M 10T trailer	4.5	12.0	6.0
Storing, cleaning pots	4 M/hrs.		4.0	
Disking (2 times)	1M 10T 6' double disk	10.0	1.8	1.8
Cultivating (3 times)	1M 10T 6' double disk	10.0	2.7	2.7
Furrowing (3 times)	1M 10T 3-row furrower	20.0	1.4	1.4
Irrigating (8 times)	3 M/hrs.		24.0	
Fertilizing	2M 10T broadcaster	40.0	0.4	0.2
Sulphuring (3 times)	1M 10T duster	40.0	0.6	0.6
Misc. tree care	4 M/hrs.		4.0	
Distribute picking equipment	2M 10T trailer	5.0	0.4	0.2
Picking	By the box			
Hauling	By the box			
Total hours per acre			67.9	13.5

COST PER ACRE FOR VALENCIA ORANGE PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	13.5	\$1.00	\$ 13.50
Irrigating	27.0	0.85	21.95
Frost protection	12.8	0.85	10.88
Pruning	10.0	0.85	8.50
Other labor	4.6	0.85	3.91
Total cost of labor			\$ 58.74
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	13.5	0.72	9.72
Furrower 3-row	1.8	0.18	0.32
Disk 6' double	4.5	0.11	0.50
Broadcaster	0.4	0.05	0.02
Heaters*			18.00
Trailer	6.2	0.05	0.31
Duster	0.6	0.20	0.12
Total cost of power units and equipment			\$ 28.94
<u>Contract and Piece Work</u>			
Picking: 400 boxes at 15¢			60.00
Hauling: 400 boxes at 6¢			24.00
Pest and disease control			44.00
Total cost of contract and piece work			\$128.00
<u>Materials</u>			
Melilotus seed: 20 lbs. at 12¢			2.40
Irrigation water: 2.5 acre ft. at \$9.50			23.75
Ammonium sulphate fertilizer: 200 lbs. at \$53 ton			5.30
Dusting sulphur: 300 lbs. at 5¢			15.00
Oil for heaters: 750 gal. at 7-1/2¢			56.25
Total cost of materials			\$102.70
<u>Miscellaneous</u>			
Taxes			18.00
Management			26.00
Depreciation of trees: \$900 to establish, 30 yrs. productive life			30.00
Interest: 4 per cent of \$900			36.00
Compensation insurance: \$2.30 per \$100 payroll			1.70
Total miscellaneous cost			\$111.70
Total cost per acre	\$430.08	Cost per box	\$1.08

*\$150 investment, 7 per cent depreciation, 5 per cent interest.

PEACHES

California is credited with about 46,000 acres of clingstone and about 32,000 acres of freestone peaches.

Cling peaches are used primarily for canning purposes, freestones for fresh shipments, for drying, and some canning.

Principal Producing Areas

Outstanding counties producing cling peaches (in order of importance) are: Sutter, Stanislaus, San Joaquin, and Tulare.

Production of freestone varieties centers in the following counties (in order of importance): Fresno, Tulare, Merced, Solano, Stanislaus, and San Joaquin.

Environmental Requirements

Soil.—With various rootstocks and varieties the peach has a rather wide adaptability. However, best results are obtained from orchards planted on deep, light-textured, well-drained sandy loams, free from alkali, with deep, open subsoil, and a total depth of at least six feet.

Climate.—The peach responds best to warm, sunny weather during a growing season of about six to seven months, with freedom from excessive rains or fogs during blossoming, mild winters but cool enough to promote dormancy, freedom from high winds, minima temperatures during the growing season of about 60 degrees and maxima of about 100 degrees. Moisture requirements total 24 to 30 acre-inches, thus necessitating use of irrigation water in most of the peach-growing areas.

Topography.—Topography is not much of a factor except as it affects preparation of land for irrigation and subsequent handling of irrigation water. Topography may vary from level to gently rolling.

Yields Per Acre (Orchards in Full Production)

	<u>Clingstones</u>	<u>Freestones</u>
Usual	8 tons	9 tons
Good	12 tons	14 tons
Exceptional	15 tons	18 tons

To convert fresh tons to dried tons use a drying ratio of: 6:1 to 7:1 for freestones, 7:1 to 8:1 for clingstones.

Age to Self-Sustaining Crop.—4 to 6 years.

Age to Full Production.—7 to 10 years.

Estimated Productive Life.—Until 20 to 25 years of age.

Spray Program

Blight and Leaf Curl.—5-5-50 Bordeaux in the fall before rains start but after leaves are off. If possible November 15 to December 15 using 360-gallon per acre.

Peach Twig Borer.—Two applications, at petal fall and in May consisting of 3-1/2 pounds basic lead arsenate plus 1/4 pound of spreader per 100 gallons at the rate of four hundred gallons per acre.

This is applicable to central California. Southern San Joaquin valley generally omits the fall spray. Northward in the Sacramento valley requires more spraying, particularly for Mildew and Brown Rot.

Examples of Cost of Producing Peaches

Examples are given below for (a) canning peaches, and (b) dried peaches based on mature orchards of 90 trees per acre.

INPUTS PER ACRE FOR CANNING PEACH PRODUCTION
9-Hour Day Yield 12 Tons

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Fall spray	3M 20T 400-gal. sprayer	10.0	2.7	0.9
Broadcast cover crop	2M 20T broadcaster	40.0	0.4	0.2
Harrowing (2 times)	1M 20T 18' spike harrow	40.0	0.4	0.4
Pruning	40 M/hrs.		40.0	
Burning brush	2M 20T brush burner	4.0	4.4	2.2
Fertilize	2M 20T broadcaster	40.0	0.4	0.2
Disking (2 times)	1M 20T 8' double disk	20.0	0.9	0.9
Spray (2 times)	3M 20T 400-gal. sprayer	10.0	5.4	1.8
Checking (3 times)	1M 20T disk ridger	10.0	2.7	2.7
Irrigating (5 times)	4 M/hrs. per time		20.0	
Cultivating (4 times)	1M 20T 8' double disk	20.0	1.8	1.8
Thinning fruit	90 M/hrs.		90.0	
Setting props	2M 20T trailer	4.0	4.4	2.2
Distribute picking equipment	2M 20T trailer	10.0	1.8	0.9
Picking	By the box			
Grading	12 M/hrs.		12.0	
Hauling (16 tr. mi.)	1M 1-1/2 tr.	1.0	9.0	
Remove props	2M 20T trailer	15.0	1.2	0.6
Misc. tree care	5 M/hrs.		5.0	
Total truck miles 16.0	Total hours per acre		202.5	14.8

COST PER ACRE FOR CANNING PEACH PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
General labor	11.3	\$0.85	\$ 9.60
Tractor and truck driver	23.8	1.00	23.80
Pruning	40.0	0.85	34.00
Irrigating	20.0	0.85	17.00
Thinning	90.0	0.85	76.50
Grading	12.0	0.85	10.20
Spraying	5.4	0.85	4.58
Total cost of labor			\$175.68
<u>Power Units and Equipment</u>			
Tractor 20 HP track	14.8	1.48	21.90
Truck (16.0 miles at 12.1¢)			1.94
Harrow 18' spike	0.4	0.04	0.02
Disk 8' double	2.7	0.15	0.40
Sprayer 400-gallon	2.7	0.83	2.24
Disk ridger	2.7	0.08	0.22
Broadcaster	0.4	0.05	0.02
Trailer	7.4	0.05	0.37
Lug boxes: 600 at 2¢			12.00
Ladders, picking buckets, pruning equipment			2.00
Props: 600 at 2¢			12.00
Brush burner	2.2	0.12	0.26
Total cost of power units and equipment			\$ 53.37
<u>Contract and Piece Work</u>			
Picking: 12 tons at \$7.50			\$ 90.00

COST PER ACRE FOR CANNING PEACH PRODUCTION

CONTINUED

	Cost
<u>Materials</u>	
Melilotus indica seed: 30 lbs. at 12¢	\$ 3.60
Bordeaux mixture, 360 gal.—5-5-50 Bluestone: 36 lbs. at 7-1/2¢	2.70
Lime: 36 lbs. at 1-1/2¢	0.54
Lead arsenate, 800 gal.—basic lead arsenate: 28 lbs. at 15¢	4.20
spreader: 2 lbs. at 30¢	0.60
Irrigation water: 2 acre ft. at \$3	6.00
Ammonium sulphate: 500 lbs. at \$53 ton	13.25
Total cost of materials	\$30.89
<u>Miscellaneous</u>	
Taxes	8.00
Management	30.00
Depreciation of trees: \$150 to establish, 15 yrs. productive life	10.00
Interest: 4 per cent of \$750	30.00
Compensation insurance: \$2.30 per \$100 payroll	3.06
Total miscellaneous cost	\$81.06
Total cost per acre \$431.00	Cost per ton \$35.92

 INPUTS PER ACRE FOR FREESTONE PEACH PRODUCTION
 9-Hour Day Yield 14 Tons Fresh, 2 Tons Dried

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Fall spray	3M 20T 400-gal. sprayer	10.0	2.7	0.9
Broadcast cover crop	2M 20T broadcaster	40.0	0.4	0.2
Harrow (2 times)	1M 20T 18' spike harrow	40.0	0.4	0.4
Pruning	40 M/hrs.		40.0	
Burning brush	2M 20T brush burner	4.0	4.4	2.2
Fertilize	2M 20T broadcaster	40.0	0.4	0.2
Disking (2 times)	1M 20T 8' double disk	20.0	0.9	0.9
Spraying (2 times)	3M 20T 400-gal. sprayer	10.0	5.4	1.8
Checking (3 times)	1M 20T disk ridger	10.0	2.7	2.7
Irrigating (5 times)	4 M/hrs. per time		20.0	
Cultivating (4 times)	1M 20T 8' double disk	20.0	1.8	1.8
Thinning fruit	90 M/hrs.		90.0	
Setting props	2M 20T trailer	4.0	4.4	2.2
Distribute picking equipment	2M 20T trailer	10.0	1.8	0.9
Picking	By box			
Hauling	1M 20T trailer	1.0	9.0	9.0
Remove props	2M 20T trailer	15.0	1.2	0.6
Misc. tree care	5 M/hrs.		5.0	
Cutting	By box			
Dry-yard labor: repair and maintenance	0.4 M/hr. per fresh ton		5.6	
Washing trays	0.9 M/hr. per fresh ton		12.6	
Shed and yard work	6.8 M/hr. per fresh ton		95.0	
Sacking	10 M/hrs.		10.0	
Hauling	By ton			
Total hours per acre			313.7	23.8

COST PER ACRE FOR FREESTONE PEACH PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
General labor	11.3	\$0.85	\$ 9.60
Tractor driver	23.8	1.00	23.80
Pruning	40.0	0.85	34.00
Spray	5.4	0.85	4.58
Irrigating	20.0	0.85	17.00
Thinning	90.0	0.85	76.50
Dry-yard and sacking	123.2	0.85	104.72
Total cost of labor			\$270.20
<u>Power Units and Equipment</u>			
Tractor 20 HP track	23.8	1.48	35.22
Broadcaster	0.4	0.05	0.02
Disk 8' double	2.7	0.15	0.40
Sprayer 400 gallon	2.7	0.83	2.24
Disk ridger	2.7	0.08	0.22
Brush burner	2.2	0.12	0.26
Trailer	16.4	0.05	0.82
Ladders, picking buckets, pruning equipment			2.00
Props: 600 at 2¢			12.00
Lug boxes: 300 at 6¢			18.00
Dry-yard equipment: \$1.82 per fresh ton			25.48
Pruning equipment	40.0	0.01	0.40
Harrow 18' spike	0.4	0.04	0.02
Total cost of power units and equipment			\$ 97.08
<u>Contract and Piece Work</u>			
Picking: 14 tons at \$8			112.00
Cutting: 14 tons at \$7			98.00
Hauling: 2 tons at \$1.50			3.00
Total cost of contract and piece work			\$213.00
<u>Materials</u>			
Irrigation water: 2 acre ft. at \$3			6.00
Sulphur; 98 lbs. at 6¢			5.88
Sacks: 60 at 10¢			6.00
Melilotus indica seed: 30 lbs. at 12¢			3.60
Bordeaux mixture, 360 gal. 5-5-50 Bluestone: 36 lbs. at 7-1/2¢			2.70
Lime: 36 lbs. at 1-1/2¢			0.54
Lead arsenate, 800 gal. basic lead arsenate: 28 lbs. at 15¢			4.20
spreader: 2 lbs. at 30¢			0.60
Ammonium sulphate: 500 lbs. at \$53 ton			13.25
Total cost of materials			\$ 42.77
<u>Miscellaneous</u>			
Taxes			8.00
Management			30.00
Depreciation of trees: \$150 to establish, 15 yrs. productive life			10.00
Interest: 4 per cent of \$750			30.00
Compensation insurance: \$2.30 per \$100 payroll			4.90
Total miscellaneous cost			\$ 82.90
<hr/>			
Total cost per acre \$705.95	Cost per dried pound 17.6¢		

Examples of Packing Costs of Shipping Peaches

Picking.—At 5 boxes per hour (or 40 boxes per day); at 90¢ per hour. Boxes hold 30-40 peaches.

Packing.—8¢ a box (at 10 to 20 boxes per hour, depending on size of fruit and skill of worker).

Packing box at 25¢.

Paper liners at 10¢ a box; label at 1/3¢; cardboard separators between layers (two layers to a box) 8/10¢.

Shed labor 4¢ a box.

Total about 48-50¢ per packed box.

PEARS (Bartletts)

Principal Producing Areas

California is credited with 34,500 acres of Bartlett pear orchards, and 5,000 acres of other varieties. In this Manual attention is confined to the Bartlett type. Of the total bearing acreage of Bartletts, 1,000 acres or more are reported for the following counties (in order of greatest acreage): Placer, Santa Clara, Sacramento, Lake, El Dorado, Solano, Mendocino, Sonoma, and Contra Costa.

Environmental Requirements

Soil.—Pears prefer a heavy, rich, moisture-holding soil, 6 feet or more in depth, well drained, free from alkali or other injurious salts. Clay loams with clay (but not tight) subsoils are preferable.

Climate.—The more favorable climatic conditions consist of mild winters followed by warm, sunny weather during a growing season of 6 to 7 months, but free from excessive heat. Freedom from frost and severe rains at blossoming time is essential. During the growing season maxima temperatures not above 100 and minima not below 40 degrees represent limits of temperature extremes.

Topography.—The topography should be level or gently rolling to permit preparation of irrigating facilities and economical use of water. Since the pear requires from 30 to 36 inches of rainfall, irrigation usually is a necessary practice to insure large crops and good quality.

Yield Per Acre (Orchards in Full Production)

	fresh basis
Usual	6 tons
Good	10 tons
Exceptional	14 tons

Drying ratio 5:1

Age to Self-Sustaining Crop.—6 to 8 years.

Age to Full Production.—10 to 12 years.

Estimated Productive Life.—Until 40 to 50 years of age.

Example of Cost of Producing Pears

This example is divided into several parts to show (a) cost of producing shipping pears, (b) cost of producing canning pears, and (c) cost of producing dried pears. In each case the cost is figured as though all the product were

directed into a single marketing outlet, while in actual practice a given grower will customarily make use of more than a single outlet, depending upon the quality of his fruit, the relative prices paid or likely to be paid by each method, and the convenience and satisfactory nature of his marketing outlets.

The data are based on a producing mature orchard in good condition, containing 108 trees per acre.

INPUTS PER ACRE FOR SHIPPING PEAR PRODUCTION
9-Hour Day Yield 10 Tons

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Pruning	45 M/hrs.		45.0	
Brush disposal	2M 10T brush burner	5.0	3.6	1.8
Dormant spray	3M 10T 300-gal. sprayer	8.0	3.3	1.1
Disking (2 times)	1M 10T 5' double disk	12.0	1.5	1.5
Spraying (4 times)	3M 10T 300-gal. sprayer	6.0	18.0	6.0
Checking (3 times)	1M 10T disk ridger	20.0	1.4	1.4
Irrigating (4 times)	4 M/hrs.		16.0	
Cultivating (3 times)	1M 10T 5' double disk	12.0	2.2	2.2
Cutting blight	25 M/hrs.		25.0	
Propping	2M 10T trailer	8.0	2.2	1.1
Distribute picking equipment	2M 10T trailer	5.0	3.6	1.8
Misc. tree care	4 M/hrs.		4.0	
Removing props	2M 10T trailer	10.0	1.8	0.9
Broadcast cover crop	2M 10T broadcaster	40.0	0.4	0.2
Harrow (2 times)	1M 10T 12' spike harrow	30.0	0.6	0.6
Picking	Contract			
Hauling to packing shed (10.0 tr. mi.)	2M 1-1/2 truck	2.0	9.0	
Total truck miles 10.0	Total hours per acre		137.6	18.6

COST PER ACRE FOR SHIPPING PEAR PRODUCTION

	Hours	Rate per hour	Cost
Labor			
General labor	14.3	\$0.85	\$ 12.15
Pruning	45.0	0.85	38.25
Tractor and truck driver	23.1	1.00	23.10
Spraying	14.2	0.85	12.08
Irrigating	16.0	0.85	13.60
Cutting blight	25.0	0.85	21.25
Total cost of labor			\$120.43
Power Units and Equipment			
Tractor 10 HP wheeled	18.6	0.72	13.39
Truck (10.0 miles at 12.1¢)			1.21
Disk ridger	1.4	0.08	0.11
Trailer	3.8	0.05	0.19
Disk 5' double	3.7	0.17	0.63
Broadcaster	0.2	0.05	0.01
Harrow 12' spike	0.3	0.02	0.01
Pruning and picking			1.25
Props: 400 at 1-1/2¢			6.00
Sprayer 300-gallon	7.1	0.53	3.76
Brush burner	1.8	0.12	0.23
Total cost of power units and equipment			\$ 26.79

CONTINUED

*If included, figure 15¢ per 42-lb. standard box; 6¢ per 24-lb. L. A. lug; 10¢ per 48-lb. S. F. lug.

INPUTS PER ACRE FOR CANNING PEAR PRODUCTION
9-Hour Day Yield 10 Tons

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Pruning	45 M/hrs.		45.0	
Brush disposal	2M 10T brush burner	5.0	3.6	1.8
Dormant spray	3M 10T 300-gal. sprayer	8.0	3.3	1.1
Disking (2 times)	1M 10T 5' double disk	12.0	1.5	1.5
Spraying (4 times)	3M 10T 300-gal. sprayer	6.0	18.0	6.0
Checking (3 times)	1M 10T disk ridger	20.0	1.4	1.4
Irrigating (4 times)	4 M/hrs.		16.0	
Cultivating (3 times)	1M 10T 5' double disk	12.0	2.2	2.2
Cutting blight	25 M/hrs.		25.0	
Propping	2M 10T trailer	8.0	2.2	1.1
Distribute picking equipment	2M 10T trailer	5.0	3.6	1.8
Misc. tree care	4 M/hrs.		4.0	
Removing props	2M 10T trailer	10.0	1.8	0.9
Broadcast cover crop	2M 10T broadcaster	40.0	0.4	0.2
Harrow (2 times)	1M 10T 12' spike harrow	30.0	0.6	0.6
Picking	By the box			
Hauling to cannery	Contract			
Total hours per acre			128.6	18.6

COST PER ACRE FOR CANNING PEAR PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
General labor	9.8	\$0.85	\$ 8.32
Pruning	45.0	0.85	38.25
Tractor driver	18.6	1.00	18.60
Spraying	14.2	0.85	12.06
Irrigating	16.0	0.85	13.60
Cutting blight	25.0	0.85	21.25
Total cost of labor			\$112.08
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	18.6	0.72	13.39
Brush burner	1.8	0.12	0.23
Sprayer 300-gallon	7.1	0.53	3.76
Disk ridger	1.4	0.08	0.11
Trailer	3.8	0.05	0.19
Disk 5' double	3.7	0.17	0.63
Broadcaster	0.2	0.05	0.01
Harrow 12' spike	0.3	0.02	0.01
Pruning and picking equipment			1.25
Props: 400 at 1-1/2¢			6.00
Total cost of equipment			\$ 25.58
<u>Contract and Piece Work</u>			
Picking: 400 boxes at 15¢			60.00
Hauling: 10 tons at \$2			20.00
Total cost of contract and piece work			\$ 80.00
<u>Materials</u>			
Irrigation water: 2 acre ft. at \$4			8.00
Blight control disinfectant			0.90
Dormant spray (200 gallons)			
Dormant oil emulsion: 10 gals. at 15¢			1.50
Liquid lime sulphur solution: 6 gals. at 13¢			0.78
Arsenate of lead spray (1,200 gallons)			
Powdered lead arsenate: 14 lbs. at 15¢			2.10
Spreader: 4 lbs. at 30¢			1.20
Melilotus seed: 30 lbs. at 12¢			3.60
Rent of lug boxes: 500 at 1-1/2¢			7.50
Total cost of materials			\$ 25.58
<u>Miscellaneous</u>			
Taxes			9.00
Management			30.00
Depreciation of trees: \$400 to establish, 50 yrs. productive life			8.00
Interest: 4 per cent of \$1,000			40.00
Compensation insurance: \$2.30 per \$100 payroll			2.30
Total miscellaneous cost			\$ 89.30
Total cost per acre	\$332.54	Cost per ton	\$33.25

INPUTS PER ACRE FOR DRIED PEAR PRODUCTION
9-Hour Day Yield 2 Tons Dried

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Pruning	45 M/hrs.		45.0	
Brush disposal	2M 10T brush burner	5.0	3.6	1.8
Dormant spray	3M 10T 300-gal. sprayer	8.0	3.3	1.1
Disking (2 times)	1M 10T 5' double disk	12.0	1.5	1.5
Spraying (4 times)	3M 10T 300-gal. sprayer	6.0	18.0	6.0
Checking (3 times)	1M 10T disk ridger	20.0	1.4	1.4
Irrigating (4 times)	4 M/hrs.		16.0	
Cultivating (3 times)	1M 10T 5' double disk	12.0	2.2	2.2
Cutting blight	25 M/hrs.		25.0	
Propping	2M 10T trailer	8.0	2.2	1.1
Distribute picking equipment	2M 10T trailer	5.0	3.6	1.8
Misc. tree care	4 M/hrs.		4.0	
Removing props	2M 10T trailer	10.0	1.8	0.9
Cover crop	Every other year			
Broadcast seed	2M 10T broadcaster	40.0	0.4	0.2
Harrow (2 times)	1M 10T 12' spike harrow	30.0	0.6	0.6
Picking	Contract			
Hauling to dry yard (10.0 truck mi.)	2M 1-1/2 truck	2.0	9.0	
Cutting	By the box			
Dry-yard labor	260 M/hrs.		260.0	
Total truck miles 10.0	Total hours per acre		397.6	18.6

COST PER ACRE FOR DRIED PEAR PRODUCTION

	Hours	Rate per hour	Cost
Labor			
General labor	14.3	\$0.85	\$ 12.15
Pruning	45.0	0.85	38.25
Tractor and truck driver	23.1	1.00	23.10
Spraying	14.2	0.85	12.08
Irrigating	16.0	0.85	13.60
Cutting blight	25.0	0.85	21.25
Drying yard	260.0	0.85	221.00
Total cost of labor			\$341.43
Power Units and Equipment			
Tractor 10 HP wheeled	18.6	0.72	13.39
Truck (10.0 miles at 12.1¢)			1.21
Brush burner	1.8	0.12	0.23
Disk ridger	1.4	0.08	0.11
Trailer	3.8	0.05	0.19
Disk 5' double	3.7	0.17	0.63
Broadcaster	0.2	0.05	0.01
Harrow 12' spike	0.3	0.02	0.01
Pruning and picking equipment			1.25

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COST PER ACRE FOR DRIED PEAR PRODUCTION

CONTINUED

	Cost
<u>Power Units and Equipment (Continued)</u>	
Dry-yard equipment	\$ 40.00
Props: 400 at 1-1/2¢	6.00
Sprayer 300 gallons: 7.1 hours at 53¢ per hour	3.76
Total cost of power units and equipment	\$ 66.79
<u>Contract and Piece Work</u>	
Picking: 400 boxes at 15¢	60.00
Cutting: 400 boxes at 15¢	60.00
Total cost of contract and piece work	\$120.00
<u>Materials</u>	
Sulphur: 120 lbs. at 6¢	7.20
Irrigation water: 2 acre ft. at \$4	8.00
Blight control disinfectant	0.90
Dormant spray (200 gallons)	
Dormant oil emulsion: 10 gal. at 15¢	1.50
Liquid lime sulphur solution: 6 gal. at 13¢	0.78
Arsenate of lead spray (1,200 gallons)	
Powdered lead arsenate: 14 lbs. at 15¢	2.10
Spreader: 4 lbs. at 30¢	1.20
Melilotus seed: 30 lbs. at 12¢	3.60
Total cost of materials	\$ 25.28
<u>Miscellaneous</u>	
Taxes	8.00
Management	30.00
Depreciation of trees: \$400 to establish, 50 yrs. productive life	8.00
Interest: 4 per cent of \$1,000	40.00
Compensation insurance: \$2.30 per \$100 payroll	6.90
Total miscellaneous cost	\$ 92.90
Total cost per acre \$646.40	Cost per ton (dried) \$323.20
	Cost per pound (dried) 16.2¢

PEAS

Peas in California are grown either for shipping as fresh peas to market or for canning purposes. Some seed peas are also produced. Fresh shipments are planted to time deliveries in the fall, winter, or spring, with a small amount of summer peas, thus making this crop available practically the year-round.

Principal Producing Areas

Land devoted to peas which mature during the spring months (March to June) occurs mainly in the following counties (listed in order of importance): San Luis Obispo, Kern, Imperial, Fresno, San Diego, and Yolo.

Peas for delivery on the fall (September to December) markets are produced principally in the following counties: Santa Clara, Kern, and Mendocino.

Peas for canning, with a portion utilized for quick freezing, are produced principally in San Joaquin and Stanislaus counties.

Environmental Requirements

Soil.—Rich loam or fine sandy loam, of good moisture-holding capacity; well drained; warm and friable; 2 feet or more in depth; free from injurious salts.

Climate.—Since the pea favors cool temperatures, hot days or hot growing seasons are not adapted. The pea does best in mild but not cold areas, of high atmospheric humidity, with not too sudden changes between day and night temperatures; hardy to slight frosts, but no frosts are preferable; ample sunshine to promote blossoming and filling of pods necessary; freedom from rains at harvest time desirable. Desired minima and maxima temperatures during a growing season of 3 to 4 months are 50 and 80 degrees respectively.

Topography.—Peas are produced under both irrigated and nonirrigated conditions. If grown under irrigation, the land must be sufficiently level to permit efficient and economical construction of irrigating facilities and handling of irrigation water.

Yields Per Acre

	Bush peas	Pole peas
Usual	2,000 lbs.	4,000 lbs.
Good	3,000 lbs.	6,000 lbs.
Exceptional	4,000 lbs.	8,000 lbs.

Example of Cost of Producing Peas

Illustrations showing costs of producing peas are given for (a) peas grown for market, and (b) peas grown for canning, both under conditions of double cropping.

INPUTS PER ACRE FOR PRODUCTION OF MARKET PEAS 9-Hour Day Yield 3,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 20T 4-14" plow	7.0	1.3	1.3
Disking (3 times)	1M 20T 10' double disk	20.0	1.4	1.4
Floating	1M 20T 12' float	15.0	0.6	0.6
Furrowing	1M 20T 4-row furrower	20.0	0.4	0.4
Irrigating	2 M/hrs.		2.0	
Planting 30" rows	1M 10T 3-row planter	15.0	0.6	0.6
Irrigating (6 times)	2 M/hrs.		12.0	
Hoeing	9 M/hrs.		9.0	
Cultivating, furrowing (5 times)	1M 10T 3-row cultivator and furrower	15.0	3.0	3.0
Cultivating, fertilizing	1M 10T 3-row cultivator, fertilizer attachment	15.0	0.6	0.6
Dusting (3 times)	1M 10T 3-row duster	25.0	1.1	1.1
Distributing picking equipment	1M 10T trailer	8.0	1.1	1.1
Picking	By pound			
Inspecting, weighing, sacking	3 M/hrs.		3.0	
Hauling to packing shed (10 tr. mi.)	2M 1-1/2 tr.	4.0	4.4	
Grading and packing	By hamper			
Hauling to market	By hamper			
Total truck miles 10.0		Total hours per acre	40.5	10.1



COST PER ACRE FOR PRODUCTION OF MARKET PEAS

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor and truck driver	12.3	\$1.00	\$12.30
Irrigating	14.0	0.75	10.50
Hoeing	9.0	0.75	6.75
Inspecting, weighing, sacking	3.0	0.75	2.25
Other labor	2.2	0.75	1.65
Total cost of labor			\$33.45
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	6.4	0.72	4.61
Tractor 20 HP track	3.7	1.48	5.48
Truck (10.0 miles at 12.1¢)			1.21
Trailer	1.1	0.05	0.06
Plow 4-14"	1.3	0.27	0.35
Disk 10' double	1.4	0.27	0.38
Float 12' plank	0.6	0.01	0.01
Furrower 4-row	0.4	0.08	0.03
Planter 3-row	0.6	0.15	0.09
Cultivator 3-row with furrower	3.6	0.14	0.50
Fertilizer attachment	0.6	0.08	0.05
Duster 3-row power	1.1	0.15	0.16
Total cost of power units and equipment			\$12.93
<u>Contract and Piece Work</u>			
Picking: 50¢ per 30 pound hamper			50.00
Hauling to packing shed: 1-1/2 tons at \$1			1.50
Grading and packing: 100 30-lb. hampers at 12¢			12.00
Hauling to market: 100 30-lb. hampers at 8¢			8.00
Total cost of contract and piece work			\$71.50
<u>Materials</u>			
Seed: 60 lbs. at 18¢			10.80
Nico dust: 20 lbs. at 20¢			4.00
Dusting sulphur: 40 lbs. at 5¢			2.00
Ammonium sulphate: 300 lbs. at \$53 ton			7.95
Irrigation water: 2 acre ft. at \$3			6.00
Hampers: 100 at 35¢			35.00
Total cost of materials			\$65.75
<u>Miscellaneous</u>			
Taxes: 1/2 of \$10*			5.00
Management: 1/2 of \$24*			12.00
Interest: 1/2 of 4 per cent of \$600*			12.00
Compensation insurance: \$1.24 per \$100 payroll			0.75
Total miscellaneous cost			\$29.75
Total cost per acre \$213.38	Cost per pound 7.1¢		

*Land double cropped.

INPUTS PER ACRE FOR PRODUCTION OF CANNING PEAS
9-Hour Day Yield 3,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 20T 4-14" plow	7.0	1.3	1.3
Disking (3 times)	1M 20T 10' double disk	20.0	1.4	1.4
Floating	1M 20T 12' float	15.0	0.6	0.6
Furrowing	1M 20T 4-row furrower	20.0	0.4	0.4
Irrigating	2 M/hrs.		2.0	
Planting 30" rows	1M 10T 3-row planter	15.0	0.6	0.6
Irrigating (6 times)	2 M/hrs.		12.0	
Hoeing	9 M/hrs.		9.0	
Cultivating, furrowing (5 times)	1M 10T 3-row cultivator and furrower	15.0	3.0	3.0
Cultivating, fertilizing	1M 10T 3-row cultivator, fertilizer attachment	15.0	0.6	0.6
Dusting (3 times)	1M 10T 3-row duster	25.0	1.1	1.1
Mowing and raking	1M 10T 7' mower, side delivery rake	18.0	0.5	0.5
Hauling to cannery (15.0 truck mi.)	3M 1-1/2 tr. hay loader (green weight 6 tons)	4.0	6.6	
Total truck miles 15.0		Total hours per acre	39.1	9.5

COST PER ACRE FOR PRODUCTION OF CANNING PEAS

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor and truck driver	11.7	\$1.00	\$11.70
Irrigating	14.0	0.75	10.50
Hoeing	9.0	0.75	6.75
Hauling	4.4	0.75	3.30
Total cost of labor			<u>\$32.25</u>
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	5.8	0.72	4.18
Tractor 20 HP track	3.7	1.48	5.48
Truck (15.0 miles at 12.1¢)			1.82
Plow 4-14"	1.3	0.27	0.35
Disk 10' double	1.4	0.27	0.38
Float 12'	0.6	0.01	0.01
Furrower 4-row	0.4	0.08	0.03
Planter 3-row	0.6	0.15	0.09
Cultivator 3-row	3.6	0.14	0.50
Fertilizer attachment	0.6	0.08	0.05
Duster 3-row	1.1	0.15	0.16
Mower 7'	0.5	0.10	0.05
Rake, side delivery	0.5	0.15	0.08
Hay loader	2.2	0.09	0.20
Total cost of power units and equipment			<u>\$13.38</u>

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COST PER ACRE FOR PRODUCTION OF CANNING PEAS

CONTINUED

	Cost
<u>Materials</u>	
Seed: 60 lbs. at 18¢	\$10.80
Nico dust: 20 lbs. at 20¢	4.00
Dusting sulphur: 40 lbs. at 5¢	2.00
Ammonium sulphate: 300 lbs. at \$53 ton	7.95
Irrigation water: 2 acre ft. at \$3	6.00
Total cost of materials	\$30.75
<u>Miscellaneous</u> (land double cropped)	
Taxes: 1/2 of \$8	4.00
Management: 1/2 of \$24	12.00
Interest: 1/2 of 4 per cent of \$600	12.00
Compensation insurance: \$1.24 per \$100 payroll	0.24
Total miscellaneous cost	\$28.24
Total cost per acre \$104.62	Cost per pound shelled 3.5¢

PLUMS

Principal Producing Areas

Plums for sale on the fresh fruit market, plus some canning, are considered as in a different category than prunes (treated in a separate section). Plums in California are reported for about 23,000 acres. The principal acreages are in the following counties (listed in order of importance): Placer, Tulare, Fresno, Kern, and San Joaquin.

Environmental Requirements

Soil.—Well drained, fertile loams or clay loams; six feet or more in depth; free from underlying stratas of compact clays, hardpan, or gravel streaks; of good moisture-holding capacity; free from injurious salts.

Climate.—Warm sunny growing season of 6 to 7 months (viz., April to October, inclusive); free from excessive heat or unseasonable cold spells; free from frost during and following blossoming; warm days and nights when fruit is ripening; freedom from rains during harvest time. Desired minima and maxima temperatures during the growing season are about 60 and 100 degrees respectively.

If grown under nonirrigated conditions, a rainfall of 18 to 24 inches annually is required for best results. When grown under irrigated conditions, the amount of rainfall is not a primary condition except as it affects the quantity and quality of the irrigation supply.

Topography.—If nonirrigated, plums can be grown under rolling topography provided the terrain is not so steep that erosion is serious or cost of operating farm implements too expensive.

If irrigated, the land must be sufficiently level so that irrigation facilities and handling of water can be accomplished efficiently and economically.

Yields Per Acre
(Mature Trees)

	<u>Irrigated</u>	<u>Nonirrigated</u>
Usual	2.0 tons	1.0 tons
Good	3.0 tons	2.0 tons
Exceptional	5.0 tons	3.0 tons

	<u>Irrigated Orchards</u>	<u>Nonirrigated Orchards</u>
Age to Self-Sustaining Crop	4-5 years	5-6 years
Age to Full Production	8-10 years	10-12 years
Estimated Productive Life	Until 30-40 years	Until 25-30 years

Example of Cost of Producing Plums

Based on a mature orchard of 76 trees per acre under irrigated conditions.

INPUTS PER ACRE FOR PLUM PRODUCTION

9-Hour Day Yield 3 Tons or 230 26-lb. Crates

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Broadcast cover crop	2M 10T broadcaster	40.0	0.4	0.2
Harrowing	1M 10T 12' spike harrow	20.0	0.4	0.4
Pruning	25 M/hrs.		25.0	
Removing brush	2M 10T trailer	10.0	1.8	0.9
Spraying	3M 10T 300-gal. sprayer	6.0	4.5	1.5
Disking (3 times)	1M 10T 5' double disk	15.0	1.8	1.8
Furrowing (2 times)	1M 10T 3-row furrower	20.0	0.9	0.9
Irrigating (2 times)	4 M/hrs.		8.0	
Dusting	1M 10T power duster	40.0	0.2	0.2
Distributing picking equipment	2M 10T trailer	6.0	3.0	1.5
Picking	18 M/hrs.		18.0	
Hauling to shed	1M 10T trailer	2.5	3.6	3.6
Packing	By crate			
Hauling	By crate			
Total hours per acre			67.6	11.0

COST PER ACRE FOR PLUM PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	11.0	\$1.00	\$11.00
Pruning	25.0	0.85	21.25
Irrigating	8.0	0.85	6.80
Picking	18.0	0.85	15.30
Other labor	5.6	0.85	4.76
Total cost of labor			\$59.11
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	11.0	0.72	7.92
Duster	0.22	0.20	0.04
Broadcaster	0.22	0.05	0.01
Harrow 12' spike	0.45	0.02	0.01
Trailer	6.0	0.05	0.30
Sprayer 300-gallon	1.5	0.53	0.80
Disk 5' double	1.8	0.17	0.31
Furrower 3-row	0.9	0.24	0.22
Picking boxes: 150 at 3¢			4.50
Total cost of power units and equipment			\$14.11

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COST PER ACRE FOR PLUM PRODUCTION

CONTINUED

	Cost
<u>Contract and Piece Work</u>	
Packing: 230 crates at 16¢	\$ 3.68
Trucking: 230 crates at 2¢	4.60
Total cost of contract and piece work	\$ 8.28
<u>Materials</u>	
Melilotus seed: 30 lbs. at 12¢	3.60
Oil for 200 gallons of dormant spray: 6 gals. at 15-1/2¢	0.93
Spreader for spray: 1/2 lb. at 30¢	0.15
Irrigation water: 1 acre ft. at \$4	4.00
Dusting sulphur: 30 lbs. at 7¢	2.10
Crates: 230 at 30¢	69.00
Total cost of materials	\$79.78
<u>Miscellaneous</u>	
Taxes	6.00
Management	30.00
Depreciation of trees: \$150 to establish, 30 yrs. productive life	5.00
Interest: 4 per cent of \$600	24.00
Compensation insurance: \$2.30 per \$100 payroll	0.70
Total miscellaneous cost	\$65.70
Total cost per acre \$226.98	Cost per 26-lb. crate 99¢

POTATOES

Principal Producing Areas

Most of the commercial potato production in California consists of early potatoes. The major production is in Kern County (75 per cent) with much lesser acreages in Tulare, Riverside, Fresno, Madera, and San Bernardino counties.

Environmental Requirements

Soil.—Fine, sandy loam, light loam, or peat soil; four feet or more in depth; of excellent moisture-holding capacity, but well drained; free from alkali or other injurious salts.

Climate.—Cool, but not cold growing season, increasing in heat units as plants progress to maturity, but free from hot spells; relatively warm nights; ample sunshine, fair amount of atmospheric humidity free from sudden changes of temperature during a growing season of from 5 to 6 months. Desired minima and maxima about 50 and 80 degrees respectively. Usually grown with use of irrigation water so amount of rainfall is a secondary consideration. Absence of rains during harvesting is desirable.

Topography.—Since the major acreage of potatoes is grown with irrigation, land must be sufficiently level to permit efficient and economical preparation for and handling of irrigation water.

Yield Per Acre

Usual	12,000 lbs.
Good	18,000 lbs.
Exceptional	25,000 lbs.

Example of Cost of Producing Potatoes

 INPUTS PER ACRE FOR POTATO PRODUCTION
 9-Hour Day Yield 18,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plow and harrow	1M 10T 2-14" plow 5' spike harrow	7.0	1.3	1.3
Cutting, dipping seed	7 M/hrs.		7.0	
Planting, fertilizing	3M 10T 2-row planter fertilizer attachment	10.0	2.7	0.9
Ridging	1M 10T 2-row shovel cultivator	10.0	0.9	0.9
Cultivating	1M 10T 2-row cultivator	12.0	1.5	1.5
Irrigating (6 times)	2 M/hrs.		12.0	
Weeding and hoeing (2 times)	4 M/hrs.		8.0	
Digging	1M 10T chain digger	6.0	1.5	1.5
Picking up	By the sack			
Hauling to packing shed	By cwt.			
Washing, grading packing, loading	Contract			
Total hours per acre			34.9	6.1

COST PER ACRE FOR POTATO PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
General labor	1.8	\$0.75	\$ 1.35
Tractor driver	6.1	1.00	6.10
Cutting and dipping seed	7.0	0.75	5.25
Irrigating	12.0	0.75	9.00
Weeding and hoeing	8.0	0.75	6.00
Total cost of labor			\$27.70
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	6.1	0.72	4.39
Plow 2-14"	1.3	0.15	0.20
Harrow 5' spike	1.3	0.01	0.01
Planter 2-row	0.9	0.18	0.16
Fertilizer attachment	0.9	0.08	0.07
Cultivator 2-row	2.4	0.10	0.24
Digger	1.5	0.17	0.26
Total cost of power units and equipment			\$ 5.33
<u>Contract and Piece Work</u>			
Hauling to packing shed: 180 cwt. at 7¢			12.60
Washing, grading, packing and loading: 180 cwt. at 8¢			14.40
Picking: 180 cwt. at 12¢			21.60
Total cost of contract and piece work			\$48.60

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COST PER ACRE FOR POTATO PRODUCTION

CONTINUED

	Cost
<u>Materials</u>	
Seed: 1,400 lbs. at \$4 cwt.	\$ 56.00
Corrosive sublimate: 2-1/4 oz. at \$4 lb.	0.56
Irrigation water: 2.5 acre ft. at \$3	7.50
Ammonium sulphate fertilizer: 600 lbs. at \$53 ton	15.90
Sacks: 180 at 22¢	39.60
Field sacks: 360 at 5¢	18.00
Total cost of materials	\$156.96
<u>Miscellaneous</u>	
Taxes	10.00
Management	24.00
Interest: 4 per cent of \$500	20.00
Compensation insurance: \$1.24 per \$100 payroll	0.70
Total miscellaneous cost	\$ 54.70
Total cost per acre \$293.29	Cost per cwt. \$1.63

PRUNES

(French)

Principal Producing Areas

California is credited with about 99,000 acres of orchards. Plantings occur in many agricultural areas, but the majority of the acreage is found in Santa Clara, Sonoma, and Napa counties.

Environmental Requirements

Soil.—Well drained, fertile loams or clay loams; six feet or more in depth; free from underlying strata of compact clays, hardpan, or gravel streaks; of good moisture-holding capacity, free from injurious salts.

Climate.—Warm sunny growing season of 6 to 7 months (viz., middle of March to October, inclusive); free from excessive heat or unseasonable cold spells; free from frost during and following blossoming; warm days and nights when fruit is maturing; freedom from rains during harvesting and curing. Desired minima and maxima temperatures during growing season are about 60 and 100 degrees respectively.

Grown under both nonirrigated and irrigated conditions, although the majority of the acreage is irrigated. If non-irrigated, an annual rainfall of about 18 to 24 inches is needed for best results. If irrigated, amount of rainfall inconsequential except as it affects the quality and quantity of the irrigating supply.

Topography.—Rolling terrain satisfactory for nonirrigated orchards provided erosion is not excessive and cost of cultivating economical. Level land required to permit construction of irrigation facilities and economical handling of water.

Yields Per Acre
(Pounds of Cured Prunes—Mature Orchards)

	Irrigated	Nonirrigated
Usual	3,000	1,500
Good	5,000	2,500
Exceptional	8,000	4,000

Note.—Drying ratio: 2.5 pounds of fresh prunes to make one pound of dried product.

	<u>Irrigated Orchards</u>	<u>Nonirrigated Orchards</u>
Age to Self-Sustaining Crop	5-6 years	6-7 years
Age to Full Production	9-10 years	10-12 years
Estimated Productive Life	Until 40-45 years	Until 30-35 years

Example of Cost of Producing Prunes

Based on a mature orchard of 74 trees per acre, in full production; on level, irrigated land.

INPUTS PER ACRE FOR PRUNE PRODUCTION
9-Hour Day Yield 2.5 Tons Dried

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Broadcast cover crop	2M 20T broadcaster	40.0	0.4	0.2
Harrow (2 times)	1M 20T 12' spike harrow	40.0	0.4	0.4
Pruning	22 M/hrs.		22.0	
Removing brush	2M 20T trailer	5.0	3.6	1.8
Spraying	3M 20T 300-gal. sprayer	4.0	6.6	2.2
Disk (5 times)	1M 20T 8' double disk	15.0	3.0	3.0
Establish basins (2 times)	1M 20T disk ridger	20.0	0.9	0.9
Irrigating (2 times)	5 M/hrs.		10.0	
Dragging (2 times)	1M 20T 12' drag	40.0	0.4	0.4
Dusting	1M 20T power duster	40.0	0.2	0.2
Fertilizing	2M 20T broadcaster	40.0	0.4	0.2
Propping	2M 20T trailer	4.0	4.4	2.2
Misc. tree care	4 M/hrs.		4.0	
Distribute lug boxes	2M 20T trailer	3.0	6.0	3.0
Picking up	By ton			
Hauling to dehydrator	Contract			
Dehydrating	Contract			
Sacking	5 M/hrs.		5.0	
Hauling to packing shed	Contract			
Storing props	2M 20T trailer	5.0	3.6	1.8
Total hours per acre			70.9	16.3

COST PER ACRE FOR PRUNE PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	16.3	\$1.00	\$ 16.30
Pruning	22.0	0.85	18.70
Irrigating	10.0	0.85	8.50
Other labor	22.6	0.85	19.21
Total cost of labor			\$ 62.71
<u>Power Units and Equipment</u>			
Tractor 20 HP track	16.3	1.48	24.12
Harrow 12' spike	0.4	0.02	0.01
Sprayer 300-gallon	2.2	0.53	1.17
Disk 8' double	3.0	0.15	0.45
Disk ridger	0.9	0.08	0.07
Drag plank 12'	0.4	0.01	0.01
Duster	0.2	0.20	0.04
Broadcaster	0.4	0.05	0.02
Trailer	7.0	0.05	0.35
Pruning and picking equipment			1.12
Props: 500 at 2¢			10.00
Total cost of power units and equipment			\$ 37.36
<u>Contract and Piece Work</u>			
Picking up: 6-1/4 tons at \$10			62.50
Hauling to dehydrator: 6-1/4 tons at \$2			12.50
Dehydrating: 6-1/4 tons at \$12			75.00
Hauling to packing shed: 2.5 tons at \$2			5.00
Total cost of contract and piece work			\$155.00
<u>Materials</u>			
Melilotus indica seed: 30 lbs. at 12¢			3.60
Ammonium sulphate: 300 lbs. at \$53 ton			7.95
Spray oil: 22.5 gal. at 21¢			4.73
Dusting sulphur: 30 lbs. at 7¢			2.10
Irrigation water: 1.5 acre ft. at \$6			9.00
Sacks: 50 at 10¢			5.00
Lug box rent: 250 at 2¢			5.00
Total cost of materials			\$ 37.38
<u>Miscellaneous</u>			
Taxes			8.00
Depreciation: \$200 to establish, 40 yrs. productive life			5.00
Management			30.00
Interest: 4 per cent of \$600			24.00
Compensation insurance: \$2.30 per \$100 payroll			1.20
Total miscellaneous cost			\$ 68.20
Total cost per acre	\$360.65	Cost per pound 7.2¢	

RICE

Principal Producing Areas

The rice growing area of the state is in the Sacramento Valley, principally in the counties of Colusa, Sutter, Butte, Glenn, and Yolo.

Environmental Requirements

Soil.—Loam soil two to four feet in depth, underlain with impervious layers so that ponds can be maintained without undue loss of water from seepage; although rice will withstand some alkali, freedom from injurious salts is desirable. Freedom from serious rice weeds.

Climate.—Warm to hot sunny weather during a growing period of about 6 to 7 months (viz., April to October, inclusive); freedom from fogs or other high humidity; freedom from rains at time of harvesting. Minima and maxima temperatures are about 60 and 100 respectively.

Topography.—Since rice is raised in ponds of standing water, very level topography is essential, especially within checks, since the level should not vary more than 2 or 3 inches within a check.

Water Supply.—Irrigation invariably required, so that a supply of water sufficient to provide from 4 to 8 acre-feet of water during the season, and to maintain ponds at constant levels is a vital necessity.

Yield Per Acre (Threshed Paddy Rice)

Usual	2,500 lbs.
Good	4,000 lbs.
Exceptional	5,000 lbs.

Example of Cost of Producing Rice

On fields properly prepared for rice culture with adequate water supply, free from serious pests. Field yield is 4,500 pounds, yielding after drying, 4,000 pounds. No sale of straw or stubble is possible.

INPUTS PER ACRE FOR RICE PRODUCTION 9-Hour Day Yield 4,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 20T 4-14" plow	10.0	0.9	0.9
Disk and harrow	1M 20T 20' single disk, 20' spike harrow	40.0	0.2	0.2
Build checks	2M 20T grader	25.0	0.8	0.4
Irrigate	2.5 M/hrs.		2.5	
Seeding	Airplane			
Fertilizing	Airplane			
Maintain ponds	1M per 320 acres for 5 months		3.7	
Weeding	Airplane			
Scaring birds	Airplane plus 1M/hr.		1.0	
Draining	0.5 M/hr.		0.5	
Harvesting	1M 12' combine (self propelled)	22.0	0.8	
Hauling to edge of field	2M 20T track trailer	22.0	0.8	0.4
Hauling to dryer	Contract			
Drying	Commercial			
Total hours per acre			11.2	1.9

COST PER ACRE FOR RICE PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor and truck driver	1.9	\$1.00	\$ 1.90
Irrigating	2.5	0.90	2.25
Maintenance of ponds and scaring birds	4.7	0.75	3.52
General labor	1.2	0.85	1.02
Total cost of labor			8.69
<u>Power Units and Equipment</u>			
Tractor 20 HP track	1.9	1.48	2.81
Plow 4-14"	0.9	0.27	0.24
Disk 20' single	0.2	0.20	0.04
Harrow 20' spike	0.2	0.05	0.01
Grader	0.4	0.37	0.15
Combine 12' self propelled	1.0	2.00	2.00
Trailer	0.4	0.14	0.06
Total cost of power units and equipment			\$ 5.31
<u>Contract and Piece Work</u>			
Airplane for seeding and weed control at \$1.25 per acre per time			2.50
Airplane for fertilizing: 150 lbs. at 5¢			7.50
Airplane for scaring birds at 50¢ per acre			0.50
Harvesting: 4,000 lbs. at 60¢ cwt.			24.00
Drying: 4,000 lbs. at 30¢ cwt.			12.00
Hauling to storage: 2 tons at \$2			4.00
Total cost of contract and piece work			\$50.50
<u>Materials</u>			
Seed, germinated: 150 lbs. (dry) at \$4.15 cwt.			6.22
Ammonium sulphate fertilizer: 150 lbs. at \$50.11 ton			3.75
Weed spray, 2, 4-D: 1-1/2 lbs. at \$1.85 and 2 gal. Diesel oil at 7-1/2¢			2.93
Water: 6 acre ft. at \$1.50			9.00
Storage: 2 tons at \$1.50			3.00
Total cost of materials			\$24.90
<u>Miscellaneous</u>			
Insurance: \$156 at \$1.50 per \$100			2.34
Taxes			6.00
Management			15.00
Interest: 4 per cent of \$400			16.00
Compensation insurance: \$4.20 per \$100 payroll			0.21
Total miscellaneous cost			\$39.55
Total cost per acre \$128.95	Cost per cwt. \$3.22		

SPINACH

Principal Producing Areas

Spinach for canning is produced principally in the following counties: Monterey, Stanislaus, Santa Clara, San Joaquin, and Orange.

Table spinach is grown principally in Los Angeles, Monterey, and Riverside Counties.

Environmental Requirements

Soil.—Grows on a wide variety of soils, but does best on fertile, well-drained loams or clay loams, free from excessive acidity or alkalinity. Freedom from weeds is essential. A minimum depth of three to four feet is essential.

Climate.—A cool season crop, able to withstand minor frosts and medium cold weather. Seed will germinate at 40 degrees but best results at 50 to 60 degrees, decreasing at higher temperatures. Desirable minima and maxima temperatures during the growing season of 70 to 100 days are 40 and 70 degrees respectively.

Topography.—Usually grown on level land, especially if grown as an irrigated crop, but topography otherwise not a factor.

Yield Per Acre

Usual	6 tons
Good	10 tons
Exceptional	15 tons

Examples of Cost of Producing Spinach

Examples are shown for both canning and market spinach.

INPUTS PER ACRE FOR CANNING SPINACH PRODUCTION 9-Hour Day

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 10T 2-14" plow	4.0	2.2	2.2
Disking (2 times)	1M 10T 6' double disk	12.0	1.5	1.5
Harrow (2 times)	1M 10T 12' spike harrow	20.0	0.9	0.9
Floating	1M 10T 8' float	12.0	0.8	0.8
Planting	1M 10T 4-row planter	12.0	0.8	0.8
Cultivating (2 times)	1M 10T 4-row cultivator	10.0	1.8	1.8
Fertilizing	1M 10T 4-row cultivator	10.0	0.9	0.9
Irrigating (2 times)	4 M/hrs.		8.0	
Hoeing and thinning	15 M/hrs.		15.0	
Cutting	1M 10T 4-row cutter	12.0	0.8	0.8
Distribute field crates	1M 10T trailer	5.0	1.8	1.8
Gathering and placing in crates	55 M/hrs.		55.0	
Hauling to cannery	Contract			
Total hours per acre			89.5	11.5

COST PER ACRE FOR CANNING SPINACH PRODUCTION

Labor	Hours	Rate per hour	Cost
Tractor driver	11.5	\$1.00	\$11.50
Irrigating	8.0	0.75	6.00
Hoeing and thinning	15.0	0.75	11.25
Harvesting	55.0	0.75	41.25
Total cost of labor			\$70.00

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COST PER ACRE FOR CANNING SPINACH PRODUCTION

CONTINUED

	Hours	Rate per hour	Cost
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	11.5	\$0.72	\$ 8.28
Trailer	1.8	0.05	0.09
Plow 2-14"	2.2	0.15	0.33
Disk 6' double	1.5	0.11	0.16
Harrow 12' spike	0.9	0.02	0.02
Float 8' x 30	0.8	0.02	0.02
Planter 4-row	0.8	0.19	0.15
Cultivator 4-row	2.7	0.18	0.49
Lug boxes: 111 at 6¢			6.66
Fertilizer attachment	0.9	0.08	0.07
Total cost of power units and equipment			\$16.27
<u>Contract and Piece Work</u>			
Hauling to cannery: 10 tons at \$2			\$20.00
<u>Materials</u>			
Seed: 8 lbs. at 25¢			2.00
Irrigation water: 1 acre ft. at \$3			3.00
Ammonium sulphate: 500 lbs. at \$53 ton			13.25
Manure: 10 tons at \$5 every other year (4 crops)			12.50
Total cost of materials			\$30.75
<u>Miscellaneous (double cropped)</u>			
Taxes: 1/2 of \$10			5.00
Management: 1/2 of \$24			12.00
Interest: 1/2 of 4 per cent of \$600			12.00
Compensation insurance: \$1.24 per \$100 payroll			0.62
Total miscellaneous cost			\$29.62
Total cost per acre	\$166.64		Cost per ton \$16.66

INPUTS PER ACRE FOR MARKET SPINACH PRODUCTION

9-Hour Day

Yield 10 Tons

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 10T 2-14" plow	4.0	2.2	2.2
Disking (2 times)	1M 10T 6' double disk	12.0	1.5	1.5
Harrow (2 times)	1M 10T 12' spike harrow	20.0	0.9	0.9
Floating	1M 10T 8' float	12.0	0.8	0.8
Planting	1M 10T 4-row planter	12.0	0.8	0.8
Cultivating (2 times)	1M 10T 4-row cultivator	10.0	1.8	1.8
Fertilizing	1M 10T 4-row cultivator, fertilizer attachment	10.0	0.9	0.9
Irrigating (3 times)	4 M/hrs.		12.0	
Hoing and thinning	30 M/hrs.		30.0	
Pulling, packing*	166 M/hrs.		166.0	
Distribute crates	1M 10T trailer	5.0	1.8	1.8
Hauling to market	Contract			
Total hours per acre			218.7	10.7

*Pulling, bunching, cutting dead leaves, trimming roots and packing in 40-lb. crates.

COST PER ACRE FOR MARKET SPINACH PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	10.7	\$1.00	\$ 10.70
Irrigating	12.0	0.75	8.00
Hoeing and thinning	30.0	0.75	22.50
Pulling, bunching, cutting dead leaves, trimming roots, and packing	166.0	0.75	124.50
Total cost of labor			\$165.70
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	10.7	0.72	7.70
Trailer	1.8	0.05	0.09
Plow 2-14"	2.2	0.15	0.33
Disk 6' double	1.5	0.11	0.16
Harrow 12' spike	0.9	0.02	0.02
Float 12' plank	0.8	0.01	0.01
Planter 4-row	0.8	0.19	0.15
Cultivator 4-row	2.7	0.18	0.49
Fertilizer attachment	0.9	0.08	0.07
Lug boxes: 111 at 6¢			6.66
Total cost of power units and equipment			\$ 15.68
<u>Contract and Piece Work</u>			
Hauling to market: 500 crates at 8¢			\$ 40.00
<u>Materials</u>			
Seed: 25 lbs. at 25¢			6.25
Irrigation water: 1.5 acre ft. at \$3			4.50
Crates: 500 at 40¢			200.00
Ammonium sulphate: 500 lbs. at \$53 ton			13.25
Manure: 10 tons at \$5 every other year (4 crops)			12.50
Total cost of materials			\$236.50
<u>Miscellaneous (double cropped)</u>			
Taxes: 1/2 of \$10			5.00
Management: 1/2 of \$24			12.00
Interest: 1/2 of 4 per cent of \$600			12.00
Compensation insurance: \$1.24 per \$100 payroll			1.74
Total miscellaneous cost			30.74
<hr/>			
Total cost per acre \$488.62 (500 crates)	Cost per 40-lb. crate 98¢		

STRAWBERRIES

Principal Producing Areas

Of eight southern California counties producing strawberries commercially, the principal counties are Santa Barbara, Los Angeles, Orange, and San Diego.

Of the counties in northern California, the most important are Santa Clara, Monterey, Sacramento, San Joaquin, and Alameda.

Environmental Requirements

Soil.—Mellow, friable, well drained, non-crusting light sandy loams of high moisture-holding capacity, free from alkali or other injurious salts; high in organic matter; free from serious perennial weeds.

Climate.—A primary essential. Freedom from unseasonable spring frosts after berry plants start to blossom and bear; free from cold air pockets; best is a warm but not hot, sunny climate, free from sudden fluctuating temperatures, during winds and cold nights. Desirable minima and maxima temperatures during a growing season of from 7 to 8 months are 50 and 70 degrees respectively.

Topography.—Level land to permit construction of proper beds and subsequent economical and efficient handling of irrigating water.

Previous Crops.—Land previously in grain, pasture, orchard, beans, other field crops, but not potatoes, tomatoes, or other truck crops.

Yield Per Acre (Beds in Full Production)

	12-basket trays	pounds
Usual	1,200	10,800
Good	2,000	18,000
Exceptional	3,000	27,000

Notes.— (a) Nine lbs. of fruit per 12-basket (dry pint) trays, or 3/4 lb. per basket.

(b) Highest yields are obtained second year after setting out plants; third and fourth years yields are about 50 to 60 per cent of second year yield.

Age to Self-Sustaining Crop.—First season after planting.

Age to Full Production.—Second season after planting.

Estimated Productive Life.—Until five to six years of age.

INPUTS PER ACRE FOR STRAWBERRY PRODUCTION 9-Hour Day Yield 18,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Mowing	1M 10T 7' mower	22.0	0.4	0.4
Raking	1M 10T 12' dump rake	30.0	0.3	0.3
Burning tops	1 M/hr.		1.0	
Furrowing (3 times)	1M 10T 3-shovel furrower	16.0	1.7	1.7
Irrigation (24 times)	3 M/hrs.		72.0	
Weeding and topping	100 M/hrs.		100.0	
Hoeing (5 times)	3 M/hrs.		15.0	
Spraying (2 times)	1M 10T weed sprayer	40.0	0.4	0.4
Dusting	1M 10T 4-row duster	20.0	0.2	0.2
Fertilizing—in irrigation water	1 M/hr.		1.0	
Picking	By crate			
Crating	4 M/hrs.		4.0	
Hauling to market	Contract			
Total hours per acre			196.0	3.0

COST PER ACRE FOR STRAWBERRY PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
General labor	6.0	\$0.75	\$ 4.50
Irrigating	72.0	0.75	54.00
Weeding and topping	100.0	0.75	75.00
Hoeing	15.0	0.75	11.25
Tractor driver	3.0	1.00	3.00
Total cost of labor			\$147.75
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	3.0	0.72	2.16
Mower 7'	0.4	0.10	0.04
Rake 12' dump	0.3	0.07	0.02
Sprayer—weed	0.4	0.12	0.05
Furrower 3-shovel	1.7	0.08	0.14
Duster 4-row	0.2	0.20	0.04
Picking equipment and field shelter			0.77
Chests—50*			28.00
Total cost of power units and equipment			\$ 31.22
<u>Contract and Piece Work</u>			
Picking: 2,000 12-basket trays at 45¢			900.00
Hauling to market: 200 12-basket chests at \$1			200.00
Total cost of contract and piece work			\$1,100.00
<u>Materials</u>			
Irrigation water: 4 acre ft. at \$8			32.00
Sulphur dust: 20 lbs. at 4¢			0.80
Black leaf 40 (400-gallon spray): 1 qt. at \$2.50			2.50
Ammonium sulphate: 500 lbs. at \$53 ton			13.25
Trays and baskets: 2,000 at 16¢			320.00
Total cost of materials			\$368.55
<u>Miscellaneous</u>			
Taxes			10.00
Management			42.00
Depreciation of plants: \$150 to establish, 3 yrs. productive life			50.00
Interest: 4 per cent of \$800			32.00
Compensation insurance: \$1.24 per \$100 payroll			12.40
Total miscellaneous cost			\$146.40
Total cost per acre	\$1,793.92	Cost per pound	10¢

*Used 4 times. Cost \$150, depreciation \$25, interest \$3

SUGAR BEETS

Principal Producing Areas

The following California counties are the principal areas of production in order of importance. Monterey, San Benito, Imperial, San Joaquin, Santa Barbara, Santa Clara, and Sacramento.

Sugar beets are grown exclusively under contract for delivery to a sugar-beet factory. Factories are located as follows:

American Crystal Sugar Company.—Clarksburg, Oxnard.

Holly Sugar Corporation.—Alvarado, Dyer, Tracy, Hamilton City.

Spreckels Sugar Company.—Manteca, Spreckels, Woodland.

Union Sugar Company.—Betteravia.

Los Alamitos Sugar Company.—Contracts with growers for the production of sugar beets but does not own a factory and its sugar beets are processed by the Holly Sugar Corporation at Dyer.

Environmental Requirements

Soil.—The sugar beet does best on fertile loams or clay loam soils but satisfactory yields are also obtained in sandy loam and fine sandy loam soils, provided the depth is 3 feet or more, without interfering layers of gravel or hardpan. Since irrigation is essential, the topography must be sufficiently level for handling of irrigation water.

Climate.—The sugar beet requires cool but not cold weather to promote growth during the developing period and later, warm, sunny weather to promote maturing and satisfactory sugar content. The crop is started during the rainy season to mature in the summer or fall months. Minima temperatures should not drop much below 32 degrees and 40 degrees is better. Maxima should not exceed 100 degrees and preferably 90 degrees. Sufficient rainfall is desirable to permit preparing seedbeds, starting and growing the plants until they have several leaves. Then irrigation can be given.

Topography.—Land sufficiently level to permit efficient and economical use of irrigation water.

Yield Per Acre

Usual	12 tons
Good	20 tons
Exceptional	30 tons

Culture and Harvesting

Sugar beets are customarily grown in rotation with beans, barley, alfalfa, or other annual field or truck crops, including some use of green manure crops. Since sugar beets are a crop subject to regulation by the Secretary of Agriculture, requirements to conserve soil fertility necessitate consideration, and full information should be obtained by anyone contemplating the raising of sugar beets for the first time.

Example of Cost of Producing Sugar Beets

INPUTS PER ACRE FOR SUGAR BEET PRODUCTION 9-Hour Day

Operations	Crew and equipment	Acres per day	Yield 20 Tons Total hours per acre	
			Man	Tractor
Disk	1M 20T 10' double disk	27.0	0.3	0.3
Chiseling	1M 20T 2-6' chisels	18.0	0.5	0.5
Plowing	1M 20T 3-14" plow	8.0	1.1	1.1
Disk and harrow (2 times)	1M 20T 10' double disk 10' spike harrow	25.0	0.7	0.7
Plane	1M 20T land plane	25.0	0.4	0.4
Harrow	1M 20T 20' spike harrow	50.0	0.2	0.2
Seeding	1M 10T grow planter	15.0	0.6	0.6
Thinning	Contract			
Hoeing (2 times)	17 M/hrs.		34.0	
Fertilizing	1M 10T 4-row cultivator, fertilizer attachment	18.0	0.5	0.5
Irrigating (3 times)	3 M/hrs.		9.0	
Cultivating (3 times)	1M 10T 4-row cultivator	18.0	1.5	1.5
Digging	1M 20T 2-row beet lifter	8.0	1.1	1.1
Pulling, topping, loading	35 M/hrs.		35.0	
Hauling	Contract			
Total hours per acre			84.9	6.9

COST PER ACRE FOR SUGAR BEET PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	6.9	\$1.00	\$ 6.90
Irrigating	9.0	0.90	8.10
Moeing	34.0	0.75	25.50
Harvesting*	35.0	0.85	29.75
Total cost of labor			\$70.25
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	2.6	0.72	1.87
Tractor 20 HP track	4.3	1.48	6.36
Plow 3-14"	1.1	0.17	0.19
Disk 10' double	1.0	0.27	0.27
Harrow 10' spike	1.1	0.02	0.02
Chisel 6'	1.0	0.07	0.07
Fertilizer attachment	0.5	0.08	0.04
Planter 6-row	0.6	0.29	0.17
Land plane	0.4	0.76	0.30
Cultivator 4-row	2.0	0.18	0.36
Beet lifter 2-row	1.1	0.06	0.07
Total cost of power units and equipment			\$ 9.72
<u>Contract and Piece Work</u>			
Thinning: 1 acre at \$14.50			14.50
Hauling: 20 tons at \$2.50			50.00
Total cost of contract and piece work			\$64.50
<u>Materials</u>			
Seed: 20 lbs. at 25¢			5.00
Irrigation water: 1.5 acre ft. at \$3			4.50
15-0-0 fertilizer: 300 lbs. at \$58 ton			8.70
Total cost of materials			\$18.20
<u>Miscellaneous</u>			
Taxes			8.00
Management			15.00
Interest: 4 per cent of \$600			24.00
Compensation insurance: \$1.24 per \$100 payroll			0.62
Total miscellaneous cost			\$47.62
Total cost per acre \$210.29	Pasture 60¢ per ton of beets		
Net cost per acre \$198.29	Cost per ton \$9.91		

*If using harvester, figure use of machine at \$7.42 per acre (or \$29.70 per day). Figure 4 acres output per day of 20-tons of beets. Add \$12.26 per acre (or 61¢ per ton) for tractor driver and other help.

Mechanical harvesting of sugar beets is still in the experimental stage but shows much promise of becoming an established practice.

The major difficulties have been the requirement of an expert operator, frequent minor adjustments, breakage of minor parts, and lower value of tops for pasture. The machines harvest about two and one half acres per row per day.

Estimated annual costs of two row machines are as follows:

Depreciation \$6,000, 10 years life	\$600.00
Taxes	34.50
Shelter	5.00
Fuel: 300 gallons at 28¢	84.00
Oil: 2-1/2 gallons at 70¢	1.75
Servicing	6.00
Repairs	138.00
Interest: 4 per cent of \$3,000	120.00
	<u>\$989.25</u>

Annual use 300 hours	
Cost per hour	\$ 3.30

Cost per acre of harvesting with a two row harvester:

Tractor driver: 1.8 hours at \$1	\$ 1.80
Digger operator: 1.8 hours at \$1	1.80
Digger, two row: 1.8 hours at \$3.30	5.94
Tractor 20 HP: 1.8 hours at \$1.48	2.66
Decreased value of tops	6.00
	<u>\$ 18.20</u>

This cost is opposed to \$32.48 for harvesting using hand methods as in the example.

SWEET POTATOES

Principal Producing Areas

Sweet potatoes are annually grown to the extent of about 10,000 acres. Principal centers of production are in the following counties: Merced, San Joaquin, San Bernardino, and Stanislaus.

Environmental Requirements

Soil.—Light to coarse fine sandy or sandy loams (for the Jersey varieties); loams (for Nancy Halls and Porto Ricos); not too acid; free from injurious salts; with a minimum depth of three feet; underlain with porous subsoils to prevent water-logging of soil.

Climate.—Long, warm growing season of 5 to 6 months; high day temperatures, warm nights, freedom from fogs or high atmospheric humidity; entirely free from frost during the growing and ripening season; desirable maxima and minima temperatures are 100 and 60 respectively. Usually grown under irrigation so rainfall not a factor except as it affects the amount and quality of the irrigating supplies.

Topography.—Such that the land lends itself readily and economically to preparation of irrigating facilities and economical handling of irrigation water.

Yield Per Acre

Usual	6,000 lbs.
Good	9,000 lbs.
Exceptional	16,000 lbs.

Example of Cost of Producing Sweet Potatoes

INPUTS PER ACRE FOR SWEET POTATO PRODUCTION

9-Hour Day

Yield 180 Bushels (9,000 Pounds)

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Disk	1M 10T 6' double disk	12.0	0.8	0.8
Broadcast cover crop	2M 10T broadcaster	40.0	0.4	0.2
Harrow	1M 10T 12' spike harrow	20.0	0.4	0.4
Disk (2 times)	1M 10T 6' double disk	12.0	1.5	1.5
Plow	1M 10T 2-14" plow	4.0	2.2	2.2
Disk	1M 10T 6' double disk	12.0	0.8	0.8
Hot bed labor	12 M/hrs.		12.0	
Pulling plants—12,500	10 M/hrs.		10.0	
Ridging	1M 10T 2-row lister	16.0	0.6	0.6
Planting	3M 10T 2-row trans- planter	4.0	6.6	2.2
Irrigating (3 times)	4 M/hrs.		12.0	
Cultivating (2 times)	1M 10T 2-row cultivator	12.0	1.5	1.5
Fertilizing	1M 10T 2-row cultivator, fertilizer attachment	10.0	0.9	0.9
Hoeing	4 M/hrs.		4.0	
Cutting tops	1M 10T 2-row vine cutter	8.0	1.1	1.1
Plowing out	1M 10T sweet potato plow	6.0	1.5	1.5
Distributing boxes	1M 10T trailer	6.0	1.5	1.5
Picking, sorting, packing	60 M/hrs.		60.0	
Hauling to ship	Contract			
Storing—1/2 of crop (2-1/4 tons)				
Hauling to celler	2M 10T trailer		5.0	2.5
Placing in bins	40 M/hrs.		40.0	
Remove from bins	25 M/hrs.		25.0	
Total hours per acre			187.8	17.7

COST PER ACRE FOR SWEET POTATO PRODUCTION

Labor	Hours	Rate per hour	Cost
General labor	7.1	\$0.85	\$ 6.04
Tractor driver	17.7	1.00	17.70
Hotbed and plant pulling labor	22.0	0.75	16.50
Irrigating	12.0	0.90	10.80
Hoeing	4.0	0.75	3.00
Picking, sorting, packing, storing	125.0	0.75	93.75
Total cost of labor			\$147.79
Power Units and Equipment			
Tractor 10 HP wheeled	17.7	0.72	12.74
Lugs: 120 at 5¢			6.00
Disk 6' double	3.1	0.11	0.34
Broadcaster	0.2	0.05	0.01
Harrow 12' spike	0.4	0.02	0.01
Plow 2-14"	2.2	0.15	0.33
Lister 2-row	0.6	0.29	0.17

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COST PER ACRE FOR SWEET POTATO PRODUCTION

CONTINUED

<u>Power Units and Equipment (Continued)</u>	Hours	Rate per hour	Cost
Transplanter 2-row	2.2	\$0.18	\$ 0.40
Cultivator 2-row	2.4	0.10	0.24
Fertilizer attachment	0.9	0.08	0.07
Vine cutter 2-row	1.1	0.07	0.08
Sweet potato plow	1.5	0.02	0.03
Trailer	1.5	0.05	0.08
Hot bed: \$15 for 5 yrs., depreciation \$3, interest 30¢			3.30
Storage cellar: \$500 for 25 acres, depreciation \$1, interest 4¢			1.04
Total cost of power units and equipment			\$24.84
<u>Contract and Piece Work</u>			
Hauling: 4.5 tons at \$2			\$ 9.00
<u>Materials</u>			
Seed: 500 lbs. at 7-1/2¢			37.50
Irrigation water: 1.5 acre ft. at \$3			4.50
Containers: furnished by buyer			
Fertilizer, 18 per cent phosphate: 300 lbs. at \$31 ton			2.06
Rye seed: 100 lbs. at 27¢			2.70
Manure for hot bed: 2 tons at \$2			4.00
Total cost of materials			\$50.76
<u>Miscellaneous</u>			
Insurance on stored potatoes			1.12
Taxes			6.00
Management			24.00
Interest: 4 per cent of \$400			16.00
Compensation insurance: \$2.45 per \$100 payroll			2.45
Total miscellaneous cost			\$49.57
Total cost per acre \$281.96		Cost per 50-lb. bushel \$1.57	

TOMATOES

Principal Producing Areas

Principal producing counties of canning tomatoes in order of importance are: San Joaquin, Yolo, Sacramento, and Stanislaus.

Principal acreages of shipping tomatoes are recorded for: San Diego, Santa Barbara, San Joaquin, Merced, and Stanislaus Counties.

Environmental Requirements

Soil.—Light warm loam or fine sandy loam, free from injurious salts, fertile but not too rich in organic matter or plant foods (since over-richness may force vine growth instead of encouraging fruiting); depth four feet or more; of good moisture-holding capacity.

Climate.—Warm but not excessively hot, sunny growing season of from 4 to 6 months following transplanting to field; freedom from frosts, cold spells, sudden changes from day to night temperatures; not too high atmospheric humidity. Minima and maxima temperatures should not fall much below 60 nor rise much above 90 degrees. If grown as nonirrigated crop, available rainfall should be from 15 to 18 inches as a minimum.

Topography.—Topography is not a factor when tomatoes are grown as a non-irrigated crop, though most plantings are on land that is not more than gently rolling. Irrigated crops require land sufficiently level so that irrigation can be conducted both efficiently and economically.

Yields Per Acre

	<u>Irrigated</u>	<u>Nonirrigated</u>
Usual	10 tons	5 tons
Good	15	8
Exceptional	20	15

Example of Cost of Producing Canning Tomatoes

This example deals with tomatoes raised under irrigated conditions, not staked on land requiring considerable preparation because of weeds.

INPUTS PER ACRE FOR CANNING TOMATO PRODUCTION

9-Hour Day		Yield 15 Tons		
Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Chisel (2 times)	1M 20T 2-6' chisels	27.0	0.7	0.7
Disk	1M 20T 10' double disk	27.0	0.3	0.3
Plow	1M 20T 4-14 plow	12.0	0.8	0.8
Disk	1M 20T 10' double disk	27.0	0.3	0.3
Plane	1M 20T land plane	25.0	0.3	0.3
Harrow	1M 20T 20' spike harrow	60.0	0.2	0.2
Mark	1M 10T 3-row marker	40.0	0.2	0.2
Cold frame labor	10 M/hrs.		10.0	
Pulling plants—1,300	1-1/2 M/hrs.		1.5	
Planting	5M 20T 2-row planters	20.0	2.0	0.4
Hauling water (10.0 truck mi.)	1M 1-1/2 tr. tank	20.0	0.4	
Furrow (2 times)	1M 10T 2-row furrower	20.0	0.9	0.9
Irrigate (3 times)	4 M/hrs.		12.0	
Cultivate (2 times)	1M 10T 2-row cultivator	20.0	0.9	0.9
Fertilize and furrow	1M 10T 2-row furrower, fertilizer attachment	20.0	0.4	0.4
Hoing (2 times)	9 M/hrs.		18.0	
Dusting (2 times)	1M 10T 2-row duster	40.0	0.4	0.4
Picking	By box			
Hauling to loading platform (30 tr. mi.)	2M 1-1/2 tr.	1.5	6.0	
Total truck miles 40.0	Total hours per acre		55.3	5.8

COST PER ACRE FOR CANNING TOMATO PRODUCTION

Labor	Hours	Rate per hour	Cost
Tractor and truck driver	9.2	\$1.00	\$ 9.20
Irrigating	12.0	0.85	10.20
Hoing	18.0	0.85	15.30
Other labor	16.1	0.85	13.68
Total cost of labor			\$48.38

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COST PER ACRE FOR CANNING TOMATO PRODUCTION

CONTINUED

Power Units and Equipment	Hours	Rate per hour	Cost
Tractor 10 HP wheeled	2.8	\$0.72	\$ 2.02
Tractor 20 HP track	3.0	1.48	4.44
Truck (40.0 miles at 12.1¢)			4.84
Duster 2-row	0.4	0.13	0.05
Chisel 6'	1.4	0.07	0.10
Disk 10' double	0.6	0.27	0.16
Plow 4-14"	0.8	0.27	0.22
Harrow 20' spike	0.2	0.04	0.01
Marker 3-row	0.2	0.01	...
Planter 2-row	0.8	0.18	0.14
Cold frame 115 sq. ft.; \$15 for 5 yrs.; depreciation \$3, interest 30¢			3.30
Cultivator 2-row	0.9	0.10	0.09
Furrower 2-row	0.9	0.08	0.07
Land plane	0.3	0.76	0.23
Fertilizer attachment	0.4	0.08	0.03
Total cost of power units and equipment			\$ 15.60
<u>Contract and Piece Work</u>			
Picking: 750 lugs at 16¢			\$120.00
<u>Materials</u>			
Seed: 1/2 oz. at \$13 lb.			0.40
Dusting material—sulphur: 15 lbs. at 3¢			0.45
Calcium arsenate: 45 lbs. at 15¢			6.75
Ammonium sulphate: 300 lbs. at \$53 ton			7.95
Irrigation water: 1-1/2 acre ft. at \$3			4.50
Total cost of materials			\$ 20.05
<u>Miscellaneous</u>			
Taxes			10.00
Management			24.00
Interest: 4 per cent of \$800			32.00
Compensation insurance: \$1.24 per \$100 payroll			0.37
Total miscellaneous cost			\$ 66.37
Total cost per acre \$270.50		Cost per ton \$18.03	

WALNUTS
(English)

Principal Producing Areas

California has a total of about 111,000 acres of walnuts. Principal producing counties in order of importance are: Ventura, Contra Costa, San Joaquin, Los Angeles, Santa Clara, Stanislaus, Riverside, Lake, San Bernardino, and Tulare.

Environmental Requirements

Soil.—A loam, fine sandy loam, or silt loam soil is deemed best for the walnut. The depth should be at least ten feet with no intervening layers or streaks of gravel, dense clay, or hardpan; high content of organic matter and ample plant foods are essential; the water table must not be standing above ten feet at any time; freedom from alkali and other injurious salts, including boron, is a necessity.

Climate.—Warm, sunny growing season of from 6 to 7 months; free from frost from time leafing starts until after nuts are harvested; not subject to intense hot spells nor unduly cold spells. Desirable minima and maxima temperatures are 60 and 90 degrees respectively. During the dormant season minima temperatures should not drop much below 24 degrees or winter-killing may result. If grown as a nonirrigated crop the walnut requires an annual rainfall of about 24 to 30 inches for best results. If irrigated, then the rainfall is important only as it affects the quantity and quality of the irrigating supply.

Topography.—The terrain of nonirrigated orchards may vary from level to fairly uneven, provided the roughness is not enough to cause excessive erosion or to create uneconomical costs of handling farming implements. For irrigated orchards the land must be level or not so rolling that construction, maintenance of irrigation facilities or handling of water create problems.

Yields Per Acre
(Mature Producing Orchards)

	<u>Irrigated</u>	<u>Nonirrigated</u>
Usual	1,000 lbs.	600 lbs.
Good	1,500 lbs.	1,000 lbs.
Exceptional	2,500 lbs.	1,800 lbs.

	<u>Irrigated Orchards</u>	<u>Nonirrigated Orchards</u>
Age to Self-Sustaining Crop	7-8 years	9-10 years
Age to Full Production	10-12 years	12-15 years
Estimated Productive Life	Until 50 years	Until 40 years

Example of Cost of Producing Walnuts

Based on a mature orchard containing 17 trees on level land, irrigated from a farm-operated pumping plant.

INPUTS PER ACRE FOR ENGLISH WALNUT PRODUCTION
9-Hour Day Yield 2,500 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Broadcast cover crop	2M 10T broadcaster	45.0	0.4	0.2
Harrow (2 times)	1M 10T 12' spike harrow	18.0	1.0	1.0
Pruning	5 M/hrs.		5.0	
Brush removal	1M 10T sled	15.0	0.6	0.6
Disking cover crop (2 times)	1M 10T 6' double disk	10.0	1.8	1.8
Fertilize	2M 10T broadcaster	45.0	0.4	0.2
Cultivate (3 times)	1M 10T 6' double disk	10.0	2.7	2.7
Furrowing (3 times)	1M 10T 3-row furrower	15.0	1.8	1.8
Irrigating (3 times)	4 M/hrs.		12.0	
Spraying	3M 10T 300-gal. sprayer	10.0	2.7	0.9
Dusting	Contract			
Drag (2 times)	1M 10T 16' drag	30.0	0.6	0.6
Propping	2M 10T trailer	15.0	1.2	0.6
Knocking	1M 10T knocker	9.0	1.0	1.0
Picking up	15 M/hrs.		15.0	
Hauling to huller	Contract			
Hulling, dehydrating	Contract			
Hauling to warehouse	Contract			
Misc. tree care	10 M/hrs.		10.0	
Removing props	2M 10T trailer	18.0	1.0	0.5
Total hours per acre			57.2	11.9

COST PER ACRE FOR ENGLISH WALNUT PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	11.9	\$1.00	\$11.90
Pruning	5.0	0.85	4.25
Irrigating	12.0	0.85	10.20
Gathering	15.0	0.85	12.75
General labor	13.3	0.85	11.30
Total cost of labor			\$50.40
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	11.9	0.72	8.57
Broadcaster	0.4	0.05	0.02
Harrow 12' spike	1.0	0.02	0.02
Trailer and sled	1.7	0.05	0.08
Disk 6' double	4.5	0.11	0.50
Furrower 3-row	1.8	0.24	0.43
Drag 16'	0.6	0.02	0.01
Props: 68 at 2¢			1.36
Sprayer 300-gallon	0.9	0.53	0.48
Total cost of power units and equipment			\$11.47
<u>Contract and Piece Work</u>			
Dusting: 1 acre at \$2			2.00
Hauling to huller: 2.5 tons at \$1.50			3.75
Hulling and dehydrating: 2,500 lbs. at \$30 ton			37.50
Hauling to warehouse: 1-1/4 ton at \$1.50			1.87
Total cost of contract and piece work			\$45.12
<u>Materials</u>			
Manure—spread: 2 tons at \$5			10.00
Vetch seed: 30 lbs. at 12¢			3.60
Irrigation water: 1.5 acre ft. at \$6			9.00
Spray (600 gallons)			
basic lead arsenate: 24 lbs. at 15¢			3.60
spreader: 6 lbs. at 30¢			1.80
Ammonium sulphate fertilizer: 200 lbs. at \$53 ton			5.30
Sacks—second hand: 55 at 10¢			5.50
Nicotine sulphate dust—4 per cent: 30 lbs. at 22¢			6.60
Total cost of materials			\$45.40
<u>Miscellaneous</u>			
Taxes			10.00
Depreciation of trees: \$300 to establish, 50 yrs. productive life			6.00
Management			30.00
Interest: 4 per cent of \$800			32.00
Compensation insurance: \$2.30 per \$100 payroll			0.69
Total miscellaneous cost			\$78.69
Total cost per acre	\$231.08	Cost per pound	9.2¢

WATERMELONS

(Other than Imperial)

Principal Producing Areas

About half the watermelon acreage of California is in the Imperial Valley. Other counties of important production in order are: Riverside, Fresno, Tulare and Stanislaus.

Environmental Requirements

Soil.—Light, warm, friable, fertile fine sandy loam, sandy loam, or light loam soil, at least four feet deep; retentive of moisture but well drained; well supplied with organic matter; free from alkali or other injurious salts.

Climate.—Warm to hot sunny days and warm nights, freedom from frost, cold winds, and high humidity at all times during the growing season of 5 to 6 months. Low atmospheric humidity during the ripening period. Minima temperatures of 60 and maxima of 100 degrees are desirable limits.

Topography.—Since customarily grown under irrigated conditions, the terrain must lend itself to proper construction of irrigating facilities and subsequent economical handling of irrigating streams.

Yield Per Acre

Usual	8 tons
Good	14 tons
Exceptional	20 tons

Weight Per Melon

Range	10-40 lbs.
Average	30

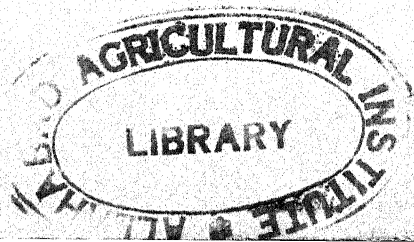
Example of Cost of Producing Watermelons (Based on Central Valley conditions.)

INPUTS PER ACRE FOR WATERMELON PRODUCTION*

9-Hour Day Yield 15 Tons

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plow	1M 10T 2-14" plow	5.0	1.8	1.8
Springtooth	1M 10T 10' springtooth	25.0	0.4	0.4
Plant 10' rows	1M 10T 2-row seeder	25.0	0.4	0.4
Furrow (2 times)	1M 10T 4-shovel furrower	20.0	0.8	0.8
Irrigate (5 times)	3 M/hrs.		15.0	
Cultivate (2 times)	1M 10T 10' harrow	15.0	0.8	0.8
Hoeing, thinning, replanting skips	10 M/hrs.		10.0	
Picking	4 M/hrs.		4.0	
Hauling to market (40 truck mi.)	2M 1-1/2 tr.	1.0	18.0	
Total truck miles 40.0	Total hours per acre		51.2	4.2

*In other than Imperial Valley



COST PER ACRE FOR WATERMELON PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor and truck driver	13.2	\$1.00	\$13.20
Irrigating	15.0	0.75	11.25
Hoeing	10.0	0.75	7.50
Picking	4.0	0.75	3.00
Other labor	9.0	0.75	6.75
Total cost of labor			\$41.70
<u>Power Units and Equipment</u>			
Tractor 10 HP wheeled	4.2	0.72	3.02
Truck (40.0 miles at 12.1¢)			4.84
Plow 2-14"	1.8	0.15	0.27
Springtooth	0.4	0.05	0.02
Seeder 2-row	0.4	0.11	0.04
Furrower 4-shovel	0.8	0.08	0.06
Harrow 10'	0.8	0.02	0.02
Total cost of power units and equipment			\$ 8.27
<u>Materials</u>			
Irrigation water: 2.5 acre ft. at \$4			10.00
Seed: 1-1/2 lbs. at \$1			1.50
Total cost of materials			\$11.50
<u>Miscellaneous</u>			
Taxes: 1/2 of \$10			5.00
Management			24.00
Interest: 4 per cent of \$500			20.00
Compensation insurance: \$1.24 per \$100 payroll			0.25
Total miscellaneous cost			\$49.25
Total cost per acre \$110.72		Cost per ton \$7.38	

WHEAT

Principal Producing Areas

Wheat is grown in all the important agricultural counties of the state, but with major acreages as follows: San Luis Obispo, Tulare, Kern, Sacramento, Siskiyou, Madera, Sutter, Monterey, San Joaquin, and Fresno.

Environmental Requirements

Wheat has relatively wide acceptable environmental conditions, as already indicated by their wide distribution throughout California under a variety of soil, climatic, and topographical features. However, the more desirable soils are fertile silt loams, 2 or more feet in depth, not subject to standing water during the rainy season, well supplied with organic matter, and free from injurious salts. The more desirable climatic conditions consist of mild, sunny, fairly cool, but not cold weather, for a growing season of 4 to 7 months, the length depending upon the time of year, cool weather during the growing season prolonging the time from planting to maturity, with minima temperatures of

about 40 degrees and maxima of about 70 degrees. During maturing somewhat warmer temperatures, viz., up to 85 to 90 degrees. Freedom from unseasonal rains and freedom from shattering winds are essential for best results. About 12 to 18 inches of water (from rainfall or irrigation) are needed to mature a good crop of quality grain, with the moisture distributed throughout the growing season.

Yields Per Acre

	Dry-farmed	Irrigated
Usual	700 lbs.	1,500 lbs.
Good	1,200 lbs.	2,000 lbs.
Exceptional	1,600 lbs.	3,000 lbs.

Examples of Cost of Producing Wheat

Costs are shown for (1) nonirrigated, and (2) irrigated conditions, both with good yields.

INPUTS PER ACRE FOR DRY-FARMED WHEAT 9-Hour Day Yield 1,200 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Plowing	1M 20T 4-14" plow	12.0	0.8	0.8
Disking (2 times)	1M 20T 20' single disk	45.0	0.4	0.4
Harrowing (2 times)	1M 20T 20' spike harrow	45.0	0.4	0.4
Seeding	2M 20T 2-10' drills	35.0	0.6	0.3
Harvesting	4M 20T 12' combine	25.0	1.6	0.4
Hauling	Contract			
Total hours per acre			3.8	2.3

COST PER ACRE FOR DRY-FARMED WHEAT

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	2.3	\$1.00	\$2.30
Seeding	0.3	1.00	0.30
Harvesting	1.2	1.00	1.20
Total cost of labor			\$3.80
<u>Power Units and Equipment</u>			
Tractor 20 HP track	2.3	1.48	3.40
Plow 4-14"	0.8	0.27	0.22
Disk 20' single	0.4	0.30	0.12
Harrow 20' spike	0.4	0.04	0.02
Drill 10'	0.6	0.31	0.19
Combine 12'	0.4	1.15	0.46
Total cost of power units and equipment			\$4.41

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COST PER ACRE FOR DRY-FARMED WHEAT

CONTINUED

	Cost
<u>Contract and Piece Work</u>	
Hauling from field to warehouse: 1,200 lbs. at \$2 ton	\$ 1.20
Storage—3 months at 75¢ a ton first month, 25¢ a ton thereafter: 1,200 lbs. at \$1.25 ton	0.75
Total cost of contract and piece work	\$ 1.95
<u>Materials</u>	
Seed: 60 lbs. at \$4 cwt.	2.40
Sacks and twine: 10 at 20¢	2.00
Total cost of materials	\$ 4.40
<u>Miscellaneous</u>	
Taxes	3.00
Management	5.25
Insurance: \$1.50 per \$100 per season, insured at \$80 a ton	1.80
Interest: 4 per cent of \$150	6.00
Compensation insurance: \$4.20 per \$100 payroll	0.08
Total miscellaneous cost	\$16.13
Total cost per acre \$30.69	Less 60¢ credit for pasture
Net cost per acre \$30.09	Cost per cwt. \$2.51

 INPUTS PER ACRE FOR IRRIGATED WHEAT PRODUCTION
 9-Hour Day Yield 2,000 Pounds

Operations	Crew and equipment	Acres per day	Total hours per acre	
			Man	Tractor
Establish borders	1M 20T disk ridger	60.0	0.2	0.2
Irrigating	2 M/hrs.		2.0	
Plowing	1M 20T 4-14" plow	12.0	0.8	0.8
Disking (2 times)	1M 20T 20' single disk	40.0	0.4	0.4
Harrowing (2 times)	1M 20T 20' spike harrow	40.0	0.4	0.4
Seeding	2M 20T 2-10' drills	35.0	0.6	0.3
Harvesting	4M 20T 12' combine	20.0	1.6	0.4
Hauling	Contract			
Total hours per acre			6.0	2.5

COST PER ACRE FOR IRRIGATED WHEAT PRODUCTION

	Hours	Rate per hour	Cost
<u>Labor</u>			
Tractor driver	2.5	\$1.00	\$ 2.50
Irrigating	2.0	0.90	1.80
Seeding	0.3	1.00	0.30
Harvesting	1.2	1.00	1.20
Total cost of labor			\$ 5.80
<u>Power Units and Equipment</u>			
Tractor 20 HP track	2.5	1.48	3.70
Disk ridger	0.2		
Plow 4-14" plow	0.8	0.27	0.22
Disk 20' single	0.4	0.30	0.12
Harrow 20' spike	0.4	0.04	0.02
Drill 10'	0.6	0.31	0.19
Combine 12'	0.4	1.15	0.46
Total cost of power units and equipment			\$ 4.71
<u>Contract and Piece Work</u>			
Hauling from field to warehouse: 1 ton at \$2			2.00
Storage—3 months at 75¢ for first month, 25¢ thereafter:			
1 ton at \$1.25			1.25
Total cost of contract and piece work			\$ 3.25
<u>Materials</u>			
Irrigation water: 0.5 acre ft. at \$2			1.00
Seed: 100 lbs. at \$4 cwt.			4.00
Sacks and twine: 17 at 27¢			4.59
Total cost of materials			\$ 9.59
<u>Miscellaneous</u>			
Taxes			5.00
Management			15.00
Insurance: \$1.50 per \$100 per season, insured at \$80 a ton			4.00
Interest: 4 per cent of \$250			10.00
Compensation insurance: \$4.20 per \$100 payroll			0.12
Total miscellaneous cost			\$34.12
Total cost per acre \$57.47	Less 50¢ credit for pasture		
Net cost per acre \$56.97	Cost per cwt. \$2.85		